The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXVI. June 12, 1937 No. 937

Industrial Research in Kindred Industries

MANY years of experience of science in industry have shown us that the conception of industrial research is extremely varied. At one end of the scale there is the head of a (usually small) business who regards investigations made by his staff that have not the most immediate concern with his pressing problems as waste of money. In such laboratories research is usually intermittent, when time can be spared from routine, and is frequently done by stealth. At the other end of the scale is the planned, often long-range, work carried out in the great and famous industrial laboratories of the world—of which the Chemical Research Laboratory at Teddington, Mellon Institute at Pittsburgh, and many another spring to mind.

During the early days of June we have had an opportunity of learning something of the organisation of the Brown-Firth metallurgical laboratories, and also of inspecting the research organisation of the Gas Light and Coke Co., in both of which undertakings may be seen to a high degree the application of research to industrial needs. The Brown-Firth laboratories will always be famed for the development of stainless steel, but to suggest that fundamental discovery of this character is the principal work of the laboratory would be wide of the mark. Its essential work lies in the consideration of scientific and technical problems arising in the operation and development of the processes and improvment, modification or utilisation of the products in which the companies are interested. The laboratory is kept very close to immediate industrial needs, but two other classes of work receive attention. One of these is fundamental scientific work, often so essential for the elucidation of difficulties; the other is the support which is accorded to the elucidation of major scientific problems in which the steel industry as a whole is collaborating. It is significant of modern industrial trends that a considerable proportion of the resources of the laboratory are devoted to assisting in the application of the various steels amongst the consuming industries. The Brown-Firth research laboratory, in short, exists to help the work of the companies who own it, and in performing that function it actively assists the whole steel industry and also the steel-consuming industries directly.

An important function of the laboratory is thus "consumer-service," a fact that is deserving of careful note. Steps taken in the extended application of stainless and other steels by associated companies are preceeded by careful investigation in the laboratories and every effort is made to maintain the closest possible touch with users in all parts of the country, and indeed in all parts of the world. For many years a special department has been maintained to deal with the technical requirements of consumers, both by correspondence and by visits. In this way the laboratories are able on the one hand to keep in the closest possible touch with the requirements of many diverse industries —an important advantage in enabling industrial needs to be foreseen, and consumer industries on their part are encouraged to call upon the laboratories for co-operation in solving problems related to the use of the steels made by the concern. In addition, there is a section of the staff whose duties are primarily to form a link between the works and the laboratory.

The continued support given to the work of the laboratory shows how valuable these activities are, but there is still a feeling in the steel industry that research and practice do not blend, and that the pendulum has swung too far in the direction of science. This is nothing to do directly with the particular laboratory whose organisation has been just discussed, but has been given vocal expression on account of the preponderance of scientific papers, as opposed to practical works papers, at meetings of the Iron and Steel Institute. It has been possible for "practical" men to maintain that "the papers which are given to-day on iron and steel are theoretical and highly problematical, being largely compiled by young men who have never done a day's work or training in the matter of production; one can hardly blame the young undergraduate for refusing to undertake a job of real work if he can obtain a lucrative position in purely research work." The dying embers of antipathy between works engineers and laboratory chemists evidently still occasionally break into flame, but the view expressed in the first sentence quoted undoubtedly represents a very real danger in industrial research.

Men are trained in universities for research by means of post-graduate courses. They are then often highly gifted experimentalists and are able to investigate scientific problems, first under direction, and later without assistance. If, however, they have no practical experience of works routine and of production, their work is handicapped fundamentally, and more especially when it becomes necessary to put the results into practice. Every first-class industrial research laboratory must number among its staff men with practical experience, but it is a matter of considerable difficulty to combine the research mind with practical experience. In the organisation of any research laboratory, that is one of the great difficulties to be overcome, and it is not wholly solved by the devices of (a) attaching an engineer to the staff, or (b) putting a man with practical experience at the head, though frequently these are the best that can be done in the existing state of affairs.

Notes and Comments

Gas Purification by Cooling

AT the recent annual meeting of the Institution of Gas Engineers, Mr. C. F. Broadhead, of the Melbourne Gas Co., stated that he had installed a Dr. Lenze cooling plant for gas purification, with satisfactory results. In this plant the sensible heat of the hot foul gas issuing from the retorts is used for the production of cold. Concentrated crude ammonia liquor is circulated through a tubular apparatus, the hot foul gas passing around the tubes. The ammonia thus liberated is collected at a pressure of 10 atmospheres, and, still under pressure, is cooled and liquefied. Vaporisation of this ammonia produces the required cold, the ammonia passing to an absorber where it is re-absorbed by the new cooled weak liquor from which it was previously distilled. Water used for cooling the gas is circulated through the vaporisers. The gas is customarily cooled to 40 to 45° F., by which means it is found that some 60 per cent. of its water content is condensed, the organic sulphur compounds are reduced to 9 grains per 100 c. ft., the naphthalene content to 0.35 grains per 100 c. ft. (this being a reduction of 95 per cent.) and the gum-forming constituents are halved. Mr. Broadhead believes that an extension of this process might be made to serve the dual purpose of reducing the temperature of the water in the washing system and dehydrating the gas subsequent to sulphuretted hydrogen removal.. The effect would be to increase the capacity of existing washers and to reduce the percentages of water, ammonia, naphthalene, organic sulphur compounds and gum-forming constituents to a degree at which they would become innocuous.

Science and Crime Detection

THOSE who have heard the fascinating lectures which are occasionally permitted to be given by police officials upon scientific methods of crime detection will be interested in a recently-issued Home Office report prepared by the late Mr. C. T. Symons. Scientific methods are not yet in general use. All forces and laboratories especially devoted to this work have been asked for periodic reports on the number and nature of each case, the experts used, and the evidence given on each side. From a total of 188 cases recorded by county forces, no less than 130 were from seven counties, with a total population of 6,028,490; whilst twenty-seven counties with a population of 3,837,294 reported no cases at all. Seventy-nine borough forces reported no cases, whilst twelve boroughs reported 280 cases. All these figures omit the Metropolitan area and the City of London, but it is also stated that 174 cases were submitted to the Hendon laboratory by the Metropolitan police and 86 from other sources. Laboratories are not yet available in sufficient numbers but it is hoped that all centres will be so equipped shortly. It is recorded that in a summary received from one force, out of four cases mentioned, two resulted in pleas of " guilty " before the accused came into court and two others of exoneration of the accused. The Home Office recommends that " first-aid scientific posts " should be equipped with (1) a binocular magnifier, (2) photographic apparatus, usually of the all film type, for recording what is found, preferably in its original position, and (3) a handy portable form of ultra-violet lamp to search for stains, for general photographic work, and for detailed examination of material such as suspected alterations of documents. These appliances can be used without damaging the material, which is then submitted, if found desirable, to scientific experts.

The Forty-Hour Week

THE movement for the reduction in the working week seems to be spreading to many countries. France has perhaps led the way, but it is not yet certain whether the result will be successful or not. It is no light matter to reduce the hours of work when competing nations take no similar step. America will probably find the reduction easier to make, than will nations more liable to competition. There can be no doubt that the movement is in step with the industrial history of the past 100 years. There is also no possible doubt that if such reduction is accompanied by increased overtime, the result will be to increase costs with no advantage to anyone save perhaps to those who gain in wages by the overtime. What is clearly needed—if shorter hours become general as we have little doubt they will—is the general increase in the number of employees, so that the work will be spread over more men. We should also anticipate, from the work of industrial psychologists, that shorter hours in many trades will result in increased output per man, so that the labour costs will not be increased in proportion to the amount of extra time theoretically to be worked. The latest move in this direction in this country is a resolution unanimously carried at the annual conference of the A.E.U. instructing the executive to approach the national employers for a 40-hour working week without reduction of pay. This does not seem the best time for a move of this character, however, in view of the difficulty of getting delivery of materials and plant. The engineering trades are working at high capacity to-day, and deliveries of orders are getting more and more distant, as those who have to purchase chemical plant are finding to their annoyance.

Trade with Palestine

THE " Monthly Record " of the Manchester Chamber of Commerce refers to the " strong desire on the part of the commercial community in Palestine to import a greater proportion of their needs in manufactured and semi-manufactured goods from the United Kingdom, which is their best market for produce." Palestine industry covers a wide field and is concerned with the chemical and allied trades in the manufacture of perfumes and cosmetics, polishes, sulphur and potash, matches, insecticides and methylated spirit; some glass and many light metal products are produced on the spot. There are tanneries, and food and drink factories; also bakelite, electric batteries and the motor trades are covered. A number of the materials for these industries would be of interest to the chemical and allied industries including chemicals, bottles, chemical fertilisers and other agricultural materials. Water supply, air-port development and other activities are going forward; a port is being constructed at Tel Aviv, with a new power station, a gas works and a petroleum refinery in view.

Achievements in Radioactivity

Dr. H. N. McCoy Receives Willard Gibbs Medal of the American Chemical Society

THE Willard Gibbs Gold Medal of the Chicago Section of the American Chemical Society, one of the highest distinctions in chemical science, was presented to Dr. Herbert Newby McCoy, on May 21. Dr. McCoy is internationally known for his achievements in radioactivity.

The presentation ceremony took place following a banquet at the Stevens Hotel, Chicago, when Dr. Paul Van Cleef, chairman of the Section, presided and delivered an address on "The Inspiration of Willard Gibbs." The presentation speech was made by Dr. Edward R. Weidlein, director of the Mellon Institute of Industrial Research and president of the American Chemical Society. The medallist, in his medal address, discussed his work on the separation of europium from other rare earths and the properties of the compounds of this element.

Dr. McCoy, for sixteen years a member of the Faculty of the University of Chicago, and now vice-president and director of research to the Lindsay Light and Chemical Co., Chicago, was cited as "pioneer in a greater number of fundamental discoveries than any but three or four living American chemists." Madame Marie Curie, according to the announcement by the medal jury, considered Dr. McCoy the outstanding American in the radioactivity field.

Transmutation of Uranium

Independently of and simultaneously with Robert John Strutt, now Baron Rayleigh, of England, and the late Professor Bertram B. Boltwood, of Yale University, Dr. McCoy was the first scientific worker to establish experimentally that radium is produced by the spontaneous transmutation of uranium. He was the first to prove that the alpha-ray activity of a uranium compound is directly proportional to its uranium content, this being the first quantitative proof that radioactivity is an atomic property. His extensive researches on alpha-ray activity revealed the quantitative relationship between range and activity, from which he developed a standard of measurement. The unit of this standard is now called, in his honour, the "McCoy Number." His work on uranium and uranium ore, followed by studies with Dr. William H. Ross, now at the United States Bureau of Soils, on thorium and radio-thorium, established the fact of the existence of elements different in identity but of identical chemical properties. Such elements were later called isotopes by Professor Frederick Soddy, of Oxford, Nobel prize winner in 1921.

Estimating CO_2 at Great Accuracy

Dr. McCoy proved experimentally that uranium is the parent of radium. With various collaborators he made the first quantitative study of the equilibrium between carbonates, bicarbonates, and carbonic acid in water solution. This fundamental work has been of important value in the study of geological formations, acid-base balance of the blood, and the manufacture of trona. An application of this work was the development, with Dr. Shiro Tashiro, of a method for the determination of carbon dioxide at a sensitivity of one ten-thousandth part of one milligram. By means of buffered solutions Dr. McCoy worked out the values of low ionisation constants. One of his most spectacular researches was the preparation, with W. C. Moore, of the first known organic amalgams, the first organic substances possessing metallic properties.

In the field of radioactivity Dr. McCoy came in contact with industrial chemistry. In 1909 he obtained from the Lindsay Light Co. a gift of two pounds of the ash from scraps of gauze left over from the manufacture of gas mantles. From this he extracted the trace of meso-thorium for his personal research needs, and then as a courtesy to the company transformed the ash into thorium nitrate. He was retained as a consultant by the company, and later became its vice-president. In 1912 he suggested that the company considered the production of thorium nitrate from monazite sand. Under his direction the process was studied and planned, the work being completed on July 4, 1914. About four weeks later the British blockade became effective. The gas mantle companies were dependent upon Germany for the bulk of their thorium nitrate, but McCoy's report covered the subject, and under his supervision a plant was put into operation on November 1, 1914, which supplied about half of the thorium nitrate used by the Allies during the World War. Still later methods were developed for extracting meso-thorium from the waste of thorium nitrate manufacture.

Radium Salts from the Ore

Incidental to another research problem, Dr. McCoy (1914) patented a new method for the preparation of radium salts direct from ore. About a year later the Carnotite Reduction Co. was organised to extract radium from the Colorado ores, producing radium bromide, uranium nitrate, and ammonium meta-vanadate. Dr. McCoy served with the company first as consultant, and from 1917 to 1920, as president. In 1920, two years before Belgian radium from the Congo deposits captured the American market, the company was sold to the Tungsten Products Co., of Colorado.

Dr. McCoy was born at Richmond, Ind., June 29, 1870. He received his doctorate from the University of Chicago in 1898. From 1899 to 1901 he was assistant professor at the University of Utah. In 1901 he returned to the University of Chicago, and became full professor there in 1911. He resigned from the University in 1917 to devote himself wholly to research based on his knowledge of radioactive elements.

The Willard Gibbs Medal, founded by William A. Converse in 1911, was named for Josiah Willard Gibbs, professor of mathematical physics at Yale University, 1871-1903, whose discoveries of the phase rule and other thermodynamical laws are the basis of modern processes of petroleum refining and of other chemical industries. The first medallist was Svante Arrhenius, of Sweden; other recipients have included Mme. Marie Curie (France), Sir James Irvine (Scotland), Dr. Richard Willstaetter (Munich), and Dr. Leo H. Baekeland and Professor Ira Remsen (United States).

I.C.I. Offer for Salt Union

Accepted by Holders of 90 per cent of Stock

IMPERIAL CHEMICAL INDUSTRIES, LTD., announces, with reference to its offer for the whole of the issued capital of Salt Union, Ltd., that the holders of the stipulated 90 per cent. of both the preference and ordinary stock of Salt Union, Ltd., have now accepted the offer of preference and ordinary stock of Imperial Chemical Industries, Ltd., in exchange for their holdings. Acceptances of the offer by the remaining stockholders of Salt Union, Ltd., will still be received. In due course Imperial Chemical Industries will proceed to acquire any outstanding stock under the terms of Section 155 of the Companies Act, 1929.

The capital of Salt Union, Ltd., is £1,400,000—£600,000 in preference stock units and £800,000 in ordinary stock units, all of £1. The offer of Imperial Chemical Industries, Ltd., was on the basis of £5 of I.C.I. preference stock for £3 of Salt Union preference stock, and for the ordinary stock, of £3 for £2.

Letters to the Editor

Industry and the Institute of Chemistry

SIR,—My attention has been drawn to a letter by "External Graduate" in THE CHEMICAL AGE, May 29. I cannot enter into a discussion with "External Graduate" on a point of view, because he is entitled to his views just as I am entitled to mine. But I must correct a misinterpretation of the sentence he quotes from my lecture at the Institute in April of this year. The quotation is:—"The existing Institute examination . . . . served the very useful purpose of enabling many who, for various reasons, had been unable to pass through the University curriculum or who had failed to reach the required standard in the University examinations . . . . to become qualified." Your correspondent calls this an innuendo which he resents. Let me say at once that the meaning I intended to convey, and which I think I did convey, was that students who by reason of their not having passed the matriculation examination or by reason of their being placed low on the list due to a variety of causes, have in the Institute examination a second chance to become qualified which otherwise did not exist.

As an old examiner of the Institute I should not be likely to discount the standard of an examination which I regard as of the highest type.—Yours faithfully,

JOCELYN THORPE.

Imperial College of Science and Technology,
South Kensington, S.W.7.

Smoke Mains for Atmospheric Pollution

SIR,—May I be permitted to express appreciation of your insistence on the important contribution towards atmospheric pollution which invisible acidic gases provide, quite in addition to the obvious smoke and dirt, in your leader on that subject in THE CHEMICAL AGE, May 29?

These gases are much more insidious than smoke and dust in that they are unseen, whilst their effects on building fabric are probably worse than the latter, and their effects on health are probably equal, if not worse. Evil effects are obviously accentuated, if their causes are hidden, obscure, and fugitive! The necessity for moving such atmospheric poisons as well as the more obvious smoke and dust, means that the use of any fuel or device to cure the *obvious* pollution problem, may leave untouched a large part of atmospheric pollution. We should then have a visibly pure atmosphere charged still with a non-locatable impurity which, therefore, would be much more difficulty avoidable than the original impurity removed.

It seems that the most practicable way to "make a thorough clean-up"—which alone can provide a satisfactory conclusion—is to remove systematically all over the country *all* combustion products of fuels which would otherwise, in any way, reinforce the atmosphere (a) against sunlight passage, (b) for building material rot, and (c) for the widespread lung or other resultant diseases. What is the use of nationalising physical exercises encouraging and needing for their performance deeper breathing, whilst retaining poisons which are thus made deeper-seated in their effects in the human system? Epecially when Britain, the most industrialised country, has most to gain by removing all atmospheric pollution, relatively.

The solution of the whole problem is the general provision of smoke and pollution "mains" in every city and area. This should not be a very difficult chemical engineering feat. Apart from the salvaging of the materials now wasted which would soon pay for these smoke mains, whilst providing labour against unemployment, incalculable advantages would at once accrue and continue to accrue cumulatively, in the general health improvement and raising of physical tone of young and old alike, quite automatic in operation, and out-of-all-proportion vaster than the most violent pursuit of physical exercises can attain; applicable, unlike those, to the aged and ageing whose need for purer air may be greater since they have longer suffered pollution cumulative effects, and operating every minute of every day and night.

As the captive smoke and pollution, then under control could not only be moved from where preventive poisons are not wanted, but also dispersed where they might conceivably be wanted—however deplorably—as, for example, in dispersal through the atmosphere round out coasts to reform in the air our insularity lost on water, this provision of smoke mains as an undeniable and most valuable social insurance against disease and darkness, should be at once available from re-armaments loans as providing a valuable defence arm with great defence potentialities. As stated above, Britain being most industrialised, it is a defence arm which would confer on this country a decided and unimpeachable advantage.

Your readers might like to give their views as to the manner in which automatic atmospheric pollution could be transferred over the coasts, at need and call, to function as a hostile aircraft barrier. Prevention being always better than cure, the prevention of hostile aircraft entry is much more desirable than the "cure" of gas shelters and bombing casualties. If aircraft are approaching to poison your population, they should be provided with the opportunity to poison themselves first. Smoke mains are certainly the basis for this realisation.—Yours faithfully,

S. C. BLACKTIN.

20 Denton Avenue,
Leeds, 8.

Chemical Matters in Parliament

Anglo-Iranian Oil Co.

IN the House of Commons on June 3 Mr. Thorne asked the Chancellor of the Exchequer whether he could give the House any information in connection with the Anglo-Iranian Oil Co., in which the British Government hold the controlling interest; what amount of new ordinary stock it will receive; what will be the total dividend paid on its £7,500,000 holding; and any other information that he can give about the matter?

In reply, Sir J. Simon quoted from a statement which was issued by the director of the company at their meeting on June 1 showing the amount of new ordinary stock the Government will receive is 3,750,000 £1 fully paid shares; and that the dividend for the year is 20 per cent. plus a bonus of 5 per cent. The profits for the year 1936 amount to £6,123,469 to which has to be added £511,126 brought forward from 1935.

After providing for extra depreciation £514,976 and placing £1,200,000 to general reserve, the directors have decided to recommend at the annual general meeting to be held on June 21, 1937, a final dividend of 15 per cent. (making 20 per cent. for the year) together with a bonus of 5 per cent. both less income tax at 5s. in the £ on the ordinary stock and to carry forward £492,135.

At the annual general meeting the directors will recommend the adoption of resolutions for the capitalisation of £2,327,500 from debenture stock redemption reserve and £4,385,000 from general reserve and for the creation and issue by way of capital bonus of 6,712,500 new ordinary shares of £1 each fully paid being at the rate of one new share for each £2 ordinary stock held on June 30, 1937, fractions being adjusted in cash such new shares to rank for dividend in respect of the year commencing January 1, 1937.

INTEREST is being taken in South Africa in canning factories for vegetables, and farmers in several districts are proposing that steps be taken to establish factories in their districts. It has been pointed out that there is no factory in South Africa for canning vegetables, apart from the pea cannery. The country is importing £90,000 of beans and peas annually, and it is felt that similar products could be produced in the country. The Government is being urged to establish a research station at a central spot, together with a small experimental canning factory.

Recovery of Bromine from Sea-Water

Expansions at the Plant of the Ethyl-Dow Chemical Co.

AN expansion programme costing one million dollars is under way at the Ethyl-Dow Chemical Co.'s plant for the recovery of bromine from the sea at Kure Beach, near Wilmington, in the United States. Capacity will be doubled, and the annual output of ethylene dibromide will be stepped up to 20,000,000 lb. to keep pace with the quickening world demand for ethyl fluid, used in the production of anti-knock gasoline for high compression motors.

Unique in industrial civilisation, and the first to exploit the mineral resources of the ocean on a commercial scale, the plant, when construction is completed on July 1, will be enabled to draw 137,000 gallons of water per minute from the sea, a volume great enough to meet the drinking requirements of two cities the size of New York, allowing each inhabitant ten gallons daily. Approximately 2,000 gallons of sea water must be treated to obtain one pound of bromine. Ethylene dibromide, which is 85 per cent. bromine, is added to tetra-ethyl lead, the anti-knock factor, to be mixed with gasoline.

Operations will be made more efficient and economical by improvements in the recovery process, developed after three years of research in the company's laboratories. The permanent operating staff, now numbering 125 chemists, skilled workers, and technical experts, will be increased to 175.

Additional Absorption Towers

Two new absorption towers are being built on the company's property, which lies between the ocean and the Cape Fear River. They supplement two towers which have been in operation since 1934, when the plant went into production as the world's bromine supply failed to meet the demands of the manufacturing programme arising from the discovery of the anti-knock qualities of tetra-ethyl lead by Thomas Midgley, who is now vice-president of the Ethyl Gasoline Corporation, and who received the Nichols Medal of the New York Section of the Chemical Society for this research. In these towers sea water, already treated with chlorine and sulphuric acid, trickles down against a current of air which absorbs the bromine liberated by chemical action. Thirty tons of chlorine will be used daily in the four towers.

Near the new absorption towers a blowing-out tower, largest single unit under construction, is being erected. This building, a square brick structure, will double facilities for the second major step in the bromine extraction process, in which a solution of soda ash is sprayed into the bromine laden air from the absorption towers to form a bromide solution many hundreds of times richer in the desired chemical than the original sea-water. This solution, in turn, is treated with strong sulphuric acid and then boiled with the aid of live steam. The bromide then passes off in the form of vapour, and is condensed.

Production of Ethylene Gas

To increase capacity for the next step, that of obtaining ethylene gas by passing ethyl alcohol over hot clay and adding it to the pure bromine, additions are being made to the building already in service. The steam building is being extended to make room for a compact new boiler of the latest self-stoking design, sharing the doubled load with the unit installed when the plant was built. Two giant electric-driven centrifugal pumps are also being added to the two already in use in the brick pump house. Built on sturdy concrete foundations only a few feet above the ocean's shifting tides, these pumps, which account for the major part of the plant's 4,500 kilowatt power requirement, suck water through intake pumps reaching into the sea between lines of heavy piling, and pump it into a canal leading to an artificial lake, from which it is drawn into the plant itself.

Between ocean and canal are two large screens, one of coarse mesh, which daily saves the lives of hundreds of fish by shunting them into an outgoing channel, and another of finer mesh near the pumping station to screen out refuse which might clog the system. The fine meshed screen can be revolved when it becomes clogged, using a strong spray of water to wash out impediments to the intake flow.

Fume Emission at Alkali, etc., Works—II.

Further Points of Interest from the Report of the Chief Inspector

A NUMBER of instances have been noted where escapes have been high in acidity following the starting up of new acid plants, or the restarting of plants which have lain idle for some time, states the Chief Inspector of Alkali, etc., Works in his annual report to which reference was made in THE CHEMICAL AGE last week. It appears that the operation is sometimes carried out without sufficient regard to the precautions that should be taken. The starting-up period is admittedly a difficult one and latitude must be allowed, but there is a tendency to over-rate the difficulties and to make them an excuse for high escapes. Within 24 hours of starting, a plant should be well under control.

Starting Up an Acid Plant

Before starting a plant, all ancillary plant, such as pumps, compressors and fans, should be inspected and tested to make sure that they are in good working order. Care should be taken to see that chamber and tower bottoms are luted with acid of the appropriate strength, *i.e.*, at least 100° Tw for the chambers and 142° Tw for the towers. The circulation tanks should be filled with supplies of both nitrous and denitrated acids. It is particularly important to hold a good stock of nitrous acid. Should the stock acids have become unduly diluted during a prolonged period of idleness, it will prove an economy to purchase the necessary supplies of the proper strength.

Usually the burners will have been brought up to red heat by burning wood, at first, and coke afterwards before they are connected to the Glover tower. At some works the hot combustion gases are led, for the last 12 to 18 hours, into the Glover tower which is fed with a small stream of chamber acid merely sufficient to keep the packing wet. All managers, however, do not favour this practice. The ammonia oxidation plant should then be brought into operation at its maximum capacity and pyrites, in small quantities, or spent oxide should be charged to the burners. A small trickle of chamber acid is maintained through the Glover tower. The burner charge is gradually increased, the temperature of the gas at the inlet of the Glover being carefully observed and a small flow of acid is also admitted to the Gay Lussac.

Steam or water spray supplies to the chambers should now be commenced and regulated according to the strength of the drips. When the burner gases attain a temperature of about 300° C., a supply of nitrous vitriol to the Glover should be started and both it and the chamber feed gradually increased as long as the acid issuing from the bottom shows that satis-

factory denitration and concentration is being accomplished. The Gay Lussac feed should also be increased in step with the Glover until the supply and demand of nitrous vitriol are balanced. The burner charge should then be worked up to normal and the ammonia oxidation plant adjusted to maintain a good colour in the last chamber.

By careful attention to these details a plant can quite readily be brought into operation and under control within 24 hours. Indeed, there is no reason why there should be an excessive escape at any time. Unremitting attention is, however, essential and continued testing of nitrosities, temperatures, drips, burner gas strength, oxygen and escape must be maintained until the good and even working of the plant is thoroughly established.

Complaints have been directed against five works. In one case, definite objection was raised to the visible exit from the sulphuric acid set. At no time was this found to exceed the statutory limit—the average for the year being, in fact, only 1.3 grains—nevertheless, the complainant's house is in such a position that under certain atmospheric conditions an escape even of low acidity is apt to be objectionable. The acid plant at this works has recently been reconstructed and the provision of a water wash tower and an additional Gay Lussac are under consideration. As a last resource, if the complaints continue, the exit can be draughted to the main chimney, but, for obvious reasons, it is preferable that other means of reducing the escape should first be exhausted.

An accident, involving the gassing of a workman by oxides of nitrogen, was reported in May. This arose through the dangerous practice of elevating nitrous acid by means of a steam injector which resulted in the evolution of nitrogen peroxide. Fortunately the victim has recovered and other means have now been adopted for moving the acid.

Troubles at Oleum Works

At Oleum works the average of all escapes was 3.34 grains, which is an improvement on the figures recorded in previous years. The trouble mentioned in last year's report in connection with fog emission from an oleum plant has continued and has been the subject of complaint. The company have pursued their researches and have come to certain conclusions as to the cause of the fog formation. It is thought that, as a result of the first steps, a definite diminution in the incidence of fogs will be made manifest within the next few months. The escape, although productive of a persistent fog, is low in total acidity. This has been achieved by the use of a final scrubber fed with ammonia and this is itself a partial contributor to the fog. It is hoped that this tendency may be counteracted without abandoning the ammonia scrub which is very effective in reducing acidity. Improvement has been effected at another works by the introduction of soda scrubbing of the exit gases.

Technical and patent literature throughout the year has contained many references to the improvement of catalysts generally, the recovery of sulphur dioxide from acid sludges produced at petroleum refineries with its subsequent conversion to sulphuric acid and to the production of sulphuric acid from waste hydrogen sulphide. A contract for the latter type of plant has been placed in this country; a vanadium catalyst will be employed and the sulphuric acid will be separated by condensation.

Chemical Manure Works

The average escape of acid gas (0.08 grain expressed as the SO_3 equivalent of hydrofluosilicic acid) at chemical manure works is a little higher than the previous year's average. A single year's average is, however, apt to be misleading because much depends on the precise state of the den at the time the test is taken. Towards the end of the mix, the acidity of the escape tends to rise. With a better understanding of the chemistry of the process and with the modern plant now available it is possible to reduce the acidity of escapes almost to vanishing point. There are four essentials to this end. (1) The gases must be cooled, (2) they must be thoroughly wetted, (3) they must be afforded a delay period to promote the decomposition of silicon tetrafluoride and (4) there must be a suitable set of towers for absorbing the acid products of decomposition.

An "Oberphos" plant with a capacity of 75,000 tons per year has been built at Avonmouth by National Fertilisers, Ltd., and has been put into operation. The plant is provided with all the most modern contrivances and is completely mechanised. The gas absorption system has proved effective in removal of the acid constituents from the waste gas. A new plant, embodying a continuous mechanical den (Brit. Pat. 444,509) has been operated by J. and W. Maxwell, at Silloth. The plant is clean and free from fume and, moreover, produces a better superphosphate than did the intermittent den which is replaced.

Synthetic Nitric Acid Plant

It was hoped that it would be possible to record a reduction in the acidity of the escapes from the large synthetic nitric acid plant to which special reference was made in last year's report. Such, however, is not the case. The plant has been used to its full capacity and, although minor adjustments have been made in connection with the feed to the final catch towers, the escape remains of the same order as before. Improvement is hardly to be expected without decrease of production or corresponding increase of scrubbing capacity. It has been decided to erect synthetic nitric acid plant at another works, where steps will be taken to ensure that ample scrubber capacity is provided.

Plants have been modified or extended and improvements effected in connection with the absorption of nitrogen oxides at a number of works. The use of copperas solution for the absorption of nitrogen oxides (as recommended in the 67th Report, Appendix IV) has been adopted at one works.

Sulphate and Muriate of Ammonia

There has been a decline of six in the number of works registered for the production of sulphate and muriate of ammonia and an increase of three in the number of works practising the concentration of gas liquor. There has been a substantial increase in the production of sulphate of ammonia from gas works liquors amounting to 11,100 tons. In the case of other works (which include coke ovens and synthetic works), there has been a slight decrease of 6,600 tons. There has been an increase of 14,800 tons in the production of concentrated ammonia.

A small plant for the preparation of ferric chloride has been entirely rebuilt in steel, lined with hard rubber. It is expected that the vessels will wear well and more than repay their cost. The Staveley Coal and Iron Co. have erected and started a plant for the production of sodium chlorate from brine; it is the only plant of its kind in this country. The experiments at Bristol, in which chlorine was being used as a sewage deodorant, have been suspended, ample rain water dilution having made its use unnecessary.

Two cases of gassing by chlorine have been noted, both happily without fatal consequences. In the first case, a man was affected by gas which was escaping from the bottom hopper of a bleach chamber. Although he had been warned of the presence of gas, he chose to wear a cloth over his mouth and nose rather than the proper gas mask which was available. Until he has received a dose, such contempt of gas is a common characteristic of the British workman and it ought not to have been possible for a man, however daring, to run into a known danger. The bleach hoppers have now been fitted with shutters at top and bottom and the intervening space filled with lime so that no gas can possibly escape. In the second case, the man was filling the cells of a new electrolytic series when he was overcome by a temporary escape from an adjacent cell, which had become blocked. Again the accident would not have occurred if a gas mask had been worn. More stringent instructions have now been issued.

The use of sulphur chloride in the manufacture of rubber substitute has received further attention but little progress has been made. The fibre separation works in Yorkshire have

not been very busy; they have been conducted in a satisfactory manner. Tinplate flux works have also been satisfactory condensers and washers having been maintained in good order. There are, however, a number of works where better recovery of tin (as oxide) might be secured by the use of longer depositing flues. Artificial silk works have been very busy. The rayon output in 1936 is estimated at 145 million pounds. Although no standard "best practicable means" has yet been definitely accepted, progress has been made in dealing with the large volumes of vitiated air which are exhausted from the spinning rooms.

Considerable attention has been devoted to processes involving the vulcanisation of rubber and several series of tests have been made. In all cases, hydrogen sulphide was found in the gases released from the vulcanising dens, but, in some cases, either the concentration or the total volume was so low that registration was not insisted upon. It appears that, in deciding the necessity or otherwise for registration, each case will have to be considered on its merits.

Arsenic Works

The condensation of arsenious oxide has been satisfactory, the average content of gases escaping from the calcination of arsenical ores being 0.038 grains As_2O_3 per cu. ft., accompanied by a total acidity of 0.65 grain. The amount of white arsenic and arsenic soot produced in Cornwall is still small, the figure in 1935 being 172 tons compared with 3,207 tons in 1924. In Sweden, one of the main arsenic producing countries, the output is of the order of 150 tons per day. The price is low and the lodes now worked in Cornwall are poor in arsenic so that calciners are finding difficulty in disposing of soot with an As_2O_3 content of between 20 per cent. and 30 per cent. A partial refinement appears to be the only means of making a material acceptable to the refiners and obviating the cost of storage or the danger of exposed heaps of arsenical soot. The use of froth flotation methods for the removal of pyrites from tin ores is growing, but in most cases it is necessary to calcine as well.

Progress has been made in the satisfactory treatment of gases arising from the manufacture of carbon bisulphide. The recovery of carbon bisulphide from crude benzole is effected by either the methanol-soda process or by the Y.T.D. method. The use of the latter especially is increasing. Four firms are now operating active carbon plants for the recovery of carbon bisulphide from the waste gases passing from cold cure processes. Several others are likely to be installed in the near future; indeed, the practice is so economical that it will probably become universal. The fear of danger from fire or explosion is a factor which militates against the adoption of the system, though, when proper precautions are used, such fear is ill founded.

Benzole and Paraffin Oil

The Barbet still is being used for removing "fronts" from benzole. Such fronts are high in carbon bisulphide and their disposal presents some difficulty. Brit. Pat. 449,710 proposes the vaporisation of carbon bisulphide obtained in this manner and mixture with an equimolecular amount of sulphur dioxide. The mixture is passed, at a temperature of from 180° C. to 250° C., through a chamber containing a catalyst which results in the production of molten sulphur. Part of the sulphur may be used to produce the sulphur dioxide required for the reaction.

At one paraffin oil works a great advance has been made by the installation of a plant for stabilising spirit, which has substantially diminished the load on the gas collecting system. The beneficial results have been made evident by the decline in the number of complaints. It is possible to operate even a large petroleum refinery without grave offence, but to do so extraordinary care and elaborate plant are essential. A new asphalt plant has been put into operation at this works and, as a large volume of tainted air would be discharged therefrom, it was feared that it might bring about a renewal of complaint. Every precaution was taken and excellent results have been achieved by scrubbing the gases with hypochlorite solution, in a scrubber of ample capacity, so as to give a long time contact. The treatment is preceded and followed by plain water scrubbing.

Loss to American Chemistry

Death of Professor W. Foster

AMERICAN science has lost an eminent and lovable man in Professor William Foster, whose death after a long illness is reported from New York. For thirty-seven years he was on the staff of Princeton University, first as assistant and then as professor of chemistry, and would have retired this month at the end of the academic year. Born at Hartford, Kentucky, in 1869, Foster took his A.B. degree at Hartford College in 1892, before going on to Vanderbilt University to study for the B.S. degree. Later he secured his Ph.D. at Princeton, joining the faculty in 1900.

While keenly interested in research, perhaps his greatest work was in making science intelligible to the average student. Many chemists of note owe their original interest in the subject to Professor Foster, who was a gifted lecturer and never failed to stress the practical applications of chemistry. It was no mere accident that the "Romance of Chemistry" was his most successful book; other titles included an "Introduction to General Chemistry," and several manuals on laboratory practice. For some years he was chief examiner in chemistry for the College Entrance Examinations Board, a central body maintained by the principal universities throughout the United States, and was a contributor to the "Journal of Chemical Education."

His gift for popular instruction was not, however, of the superficial kind which often characterises popular science. William Foster had made a name by his researches on the compounds of arsenic, chlorinated ethers, and the conductivity of electrolytes. He devoted much time to a study of Dr. John MacLean, who had established at Princeton, in 1795, the first professorship of chemistry in an American college. He was also keenly interested in Biblical references to science, and once gave an informative address in the Murray Dodge chapel on the paradox of the salt which had "lost its savour." During the past few years, Foster conducted studies in the application of chemistry to archæology, and in his laboratory at Princeton had assisted archæologists of the American School of Classical Studies in identifying finds at Athens and Corinth. His work, which centred principally on analysis of the glaze on Greek vases, composition of old coins and similar small objects, led to the establishment this year of a small chemical laboratory on the site at Athens under the direction of Professor Earle R. Caley.

All those who worked under Professor Foster, whether staff or undergraduates, will mourn the loss of an inspiring leader, who was also a wise counsellor and friend. Much sympathy will be extended to Mrs. Foster, whose house in Battle Road was a second home to many Princeton students.

J.A.B.

AN Imperial Japanese Government Ordinance, issued on March 15, 1937, provides that imports into Japan and exports from Japan of ammonium sulphate are subject to official license.

Oil from Cannel Coal

Edinburgh Gas Engineers on its Potentialities

A LEAD from Government Departments in connection with the production of oil from coal in Scotland was suggested by Mr. James Jamieson, gas engineer, Edinburgh, in a talk to the Edinburgh City Business Club on May 18. Publicity had been given, he said, to the investigations carried out at Granton Gasworks in conjunction with the Fuel Research Board, on the potentialities of cannel as a contributor to our supplies of home-produced oil. More than 20,000 tons of cannel were treated over a period of 14 months, and twelve complete tests or examinations were made. The investigation was of a fairly comprehensive nature. The ordinary gasworks retorts were used, and no special arrangements or alterations were made beyond those required for handling and segregating the liquid products. No large capital outlays were, therefore, essential for the immediate utilisation and exploitation of suitable cannel in a modern gasworks. This was a factor which must prove of the utmost importance in any emergency which might arise in the future.

In 1904 Edinburgh Gas Department used 43 per cent. of cannel. If a similar percentage were used to-day it would produce nearly five million gallons of crude oil which on hydrogenation would yield a similar quantity of motor spirit, or 50 per cent. of the total production by Scottish oils from the carbonisation of shale during 1935, and equivalent to 60 per cent. of the estimated consumption of petrol in Edinburgh, and five times more than that required for the Transport Department.

In the event of war, he estimated that the Edinburgh municipal gas undertaking could, in addition to the 230,000 tons of coal used normally, carbonise with surplus plant over 100,000 tons of cannel per annum for the production of oil and compressed gas. This quantity of cannel would produce at least five million gallons of fuel oil which could be used as such or be distilled, cracked, or hydrogenated when it would give an equal amount of motor spirit. If the gas from the cannel were compressed and used for motor transport the net result would be the equivalent of ten million gallons of imported petroleum products.

It was generally agreed that cannel existed in different parts of the country. He understood there were large deposits in Wales, a district which had suffered probably more from depression than any other in the British Isles. In Scotland they seemed to have ample for their immediate requirements. Had nature endowed a country like Germany with these valuable mineral deposits he felt certain every coalfield would have been thoroughly surveyed and every pound earmarked. Probably ample reserves would have been stored above ground, and the processing of cannel would now be an everyday operation.

A New Acid-Resisting Alloy

Especially Suitable for Hydrochloric Acid

A NEW alloy known as "Hastelloy B" is now being offered for use under extremely severe conditions of corrosion. The new alloy has been developed by two subsidiaries of Union Carbide and Carbon Corporation working in collaboration—Haynes Stellite Co. and Union Carbide and Carbon Research Laboratories, Inc. Hastelloy B is a further addition to the series of Hastelloy alloys which were originally developed eight years ago, and, like the others, is being marketed by Haynes Stellite Co. of Kokomo, Indiana.

This new alloy has been produced primarily for service in equipment handling hydrochloric acid in all concentrations and at temperatures up to and including the boiling point. It also stands up well in sulphuric and phosphoric acids, acetic and other organic acids, and in non-oxidising acid chloride solutions. In 20 per cent. hydrochloric acid at the boiling point the rate of penetration of the solution is only 0.0016 in. per month. The alloy is composed of nickel, molybdenum and iron. In this respect it is similar to Hastelloy A, except that the proportion of iron has been decreased and the molybdenum content increased. The increase in molybdenum content results in a higher ultimate tensile strength and higher yield point, with practically no loss in ductility or in reduction of area.

The physical properties of Hastelloy B are comparable to those of a good grade of alloy steel—the tensile strength in the forged, rolled and fully annealed state being about 135,000 to 140,000 lb. per sq. in. with an elongation of 44 per cent. in 2 in. The hardness and strength, although making it somewhat difficult to forge, are of good advantage in other ways, for the alloy is unusually strong at high temperatures, as well as at room temperature.

Since Hastelloy B can be forged and rolled, it is available in a number of different forms. Among these, the most important are castings, wrought parts, rolled plate and sheet, wire and welded tubing. Some of the more important applications for Hastelloy B are agitator units, heating and cooling coils, pumps and pump parts, condensers, pickling tanks, valves, pipe and fittings. It is expected that because of its excellent physical and mechanical properties, together with its high resistance to hydrochloric and other mineral acids, Hastelloy B will find widespread use for equipment in the chemical and process industries.

Empire Mineral Resources

New Facts Revealed by the Imperial Institute

A REMARKABLY comprehensive publication on the mineral industry of the British Empire has just been issued by the Mineral Resources Department of the Imperial Institute, London.* Commencing with an interesting comparison of the world and Empire outputs of all the more important minerals used in industry in 1929 and 1935, the work surveys the many changes bearing on production during this period, and illustrates by means of graphs the variations in annual output of 12 essential commodities.

All the important metals and minerals except gold clearly show the effects of the great slump which occurred in the intervening years. The book goes on to discuss briefly the degree of Empire independence in the matter of mineral supplies, according to which it appears that the Empire as a whole is largely dependent on foreign sources of supply for only eight minerals, *i.e.*, antimony, borates, molybdenum, petroleum, potash, pyrites, quicksilver and sulphur.

The main body of the book consists of a concise survey of the mineral deposits and mining industries in each Empire country that produces minerals or that is a potential producer, commencing with the United Kingdom and the Dominions, and continuing with the colonies, protectorates, mandated territories, etc. The procedure adopted in dealing with all these countries is the same throughout. A preliminary statement concerning the mineral industry of the country is followed by a table of output for 1935, and a summary of mineral imports showing countries of origin and exports showing destinations. Each mineral, mined or occurring in the country, is dealt with separately, the minerals being arranged approximately in order of importance, according to the value of the output. The situation in 1935 is compared with that in 1929, but wherever possible later information is included so that the publication is quite up to date.

Many interesting facts are brought to light in this remarkable little book, which covers such a vast field in the space of 166 pages. For instance, it appears that in 1935 the Empire produced 86.6 per cent. of the world's nickel and 68.2 per cent. of the world's asbestos, but both these percentages are considerably lower than in 1929.

The total value of the Empire's mineral output during 1935 approximated to £400 million, of which the United Kingdom contributed nearly 42 per cent., the Union of South Africa just over 21 per cent., and Canada 16 per cent.

* The Mineral Position of the British Empire. Imperial Institute. London, 1937. 4s.

Lead Alloy Castings : an Alternative to Lead Linings

By BRIAN N. REAVELL

LEAD is commonly used as a metal to withstand sulphuric and other acids; it is supplied either as a sheet lining or as a homogeneous lining to some constructional material such as mild steel, or as a solid casting. For simple conditions, such as a storage tank for cold acid, it is usual to employ a sheet lining of lead inside a steel or wooden tank, but when frequent temperature changes occur, or if the tank is subject to pressure or vacuum, the sheet lead lining is not satisfactory owing to low mechanical strength, in such cases homogeneous lining on steel is used.. In the past, cast lead has been mostly used for small parts, such as valve bodies, tank outlet plug seats, flanges, etc. The only notable improvement in sheet lining, in recent years, has been the introduction of tellurium lead, which, owing to its "work-hardening" characteristcs and mechanical strength, possesses numerous advantages over ordinary chemical lead. With homogeneous coating, no really new methods have been

Fig. 1. This vessel, cast in lead alloy, was designed to work under a vacuum of 28½ in.; it is used for 60 per cent. sulphuric acid.

introduced; the only improvement is in technique and methods of application. Casting lead, however, has developed rapidly and is now, despite the high cost of metal, competitive with homogeneous lining in many cases.

The use of a lining is a compromise and, up to a point, it is satisfactory, but trouble is liable to occur in any lead-lined plant, under certain conditions. It is not always possible to detect a minute pin-hole or hair-crack which has formed in the lead during the lining process or after the plant is in operation, and this slight defect will quickly start severe corrosion of the body of the lined plant. Temperature changes from hot to cold, if taking place too quickly, are liable to cause cracks in even the best homogeneous lining. Repairs to the effected part are very difficult, as they must be carried out internally. For this reason many ingenious test methods have been developed by manufacturers, in an endeavour to discover the existance of any defect before the plant is put into operation, but, to overcome these difficulties, the attention of some firms has turned towards the use of lead castings and, by choice of suitable alloys, careful design and improved foundry technique, highly intricate castings of considerable size and dimensions are now being produced.

From the user's point of view, these castings are attractive in many ways and, assuming that any given part of a plant can be made, either as a casting in lead alloy or homogeneously lined, the relative merits should be carefully considered. As a general rule, the cost of either is about the same, although the author has known cases in which the cast lead parts were as much as 50 per cent. cheaper than a similar part made in welded mild steel, lead lined. The advantage in price applies particularly for awkwardly shaped parts, as

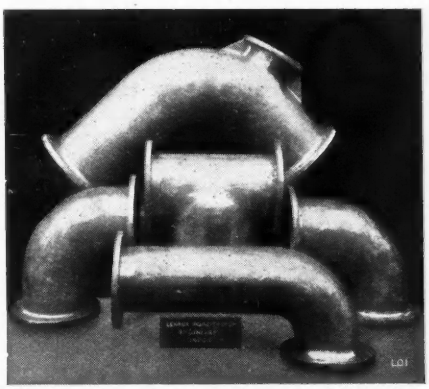

Fig. 2. Branch connections for 14 in. pipe line as cast in lead alloys.

opposed to plain surfaces. For example, a loose fitting flat cover for an acid-mixing vessel, say, 3 ft. 6 in. diameter, with no holes or branches in it, as opposed to a dished cover, of the same diameter, required for a reaction vessel to work under vacuum, with half a dozen small flanged connections in it for sight glasses, charging holes, etc. For the former, the homogeneous lead lining on steel would certainly be cheaper, and quite satisfactory, but, for the latter, the awkwardness of lining the curved surfaces and branches would probably give the advantage of cost and reliability to the cast construction.

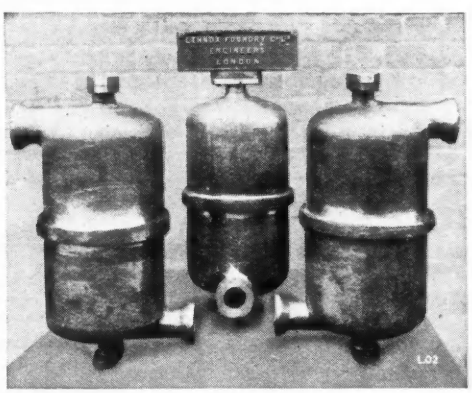

Fig. 3. Lead alloy castings : a group of priming bottles for acid pumps.

However, the initial cost of the job is not so important in many cases as the upkeep and running costs. Any part of a homogeneously lead-lined plant, which is subject to excessive wear, either by corrosion, erosion or mechanical stress, will fail rapidly as soon as the protective lead coating has been injured. Unless frequent internal inspection is carried out, the failure is only noticed by finding acid leaking through externally and, by this time, serious damage will have been done to the steel or iron walls of the vessel.

To repair a lined part which has failed in this way it is often necessary to cut away several feet of lead and make a

large patch on the steel, then reline the inside—an expensive and, sometimes, impossible task. Repairs of this kind on a cast lead plant are quite simple, as it is only necessary for the works plumber to burn a patch of lead over the damaged area from outside, without even opening up the plant to get inside, and a lengthy shut-down in thereby avoided. This advantage weighs heavily in favour of cast lead construction.

The difficulties in producing satisfactory castings were numerous, until the problem was studied in a scientific way. Methods of moulding and pouring, which have been generally adopted for iron casting, are not often satisfactory for lead alloys. Many of the early failures were due to foundries equipped for the production of cast iron trying to employ the same technique for lead castings. An example of this is the production of antimonial lead tubes, 2 in. diameter and 4 ft. 6 in. long, which cannot be cast by any of the usual methods employed for cast iron. The high density of lead causes a huge strain on the core and faulty tubes were frequent when ordinary sand cores were employed. These troubles have now been entirely overcome.

Some examples of recent work, executed by the Lennox Foundry Co., Ltd., are shown in the accompanying illustrations. Fig. 1 shows a vessel with bolted-on cover, six liquor inlet branches on the side and a large vapour outlet branch at the top. This vessel was required to work under 28½-in. vacuum, carrying concentrated 60 per cent. sulphuric acid, and is subjected to a hydraulic test of 40 lb. per sq. in. before being put into commission. Fig. 2 shows a 14 in. diameter pipe line, with branch connections for carrying acid gas under vacuum at about 50° C. working temperature. Fig. 3 shows a group of priming bottles for centrifugal acid pumps.

Whenever possible, it is preferable for the plant maker to have some hand in the design, shape and details of any part required to be cast, as he can tell, by experience, the best thickness of metal and other particulars which make for good castings. If, however, a particularly awkward part is wanted and no variation in design can be allowed, there is often a way out of the difficulty in adopting a combination of cast and welded construction. Lead welding or lead burning can be successfully applied to all common alloys of lead, with satisfactory results, and some intricate parts have been produced. Care must be taken to see that suitable metal is used for the welds, as success depends largely on this. It is sometimes overlooked that the melting point of an alloy (for example, 6 per cent. antimony, 94 per cent. lead) is appreciably different from that of pure chemical lead, and, if a deep fillet is laid by the welder using rods of pure lead on the alloy, visible cracks may appear as the metal cools, due to the difference in melting points. Such troubles have been overcome by using suitable welding rods and a good welder can now fabricate cast parts so well that it is sometimes difficult to trace the weld from superficial examination.

New Technical Books

CERAMIC DATA BOOK, 1937 (ninth) Edition. Chicago Industrial Publications.

This well-known book is as excellent as in previous years. It contains equipment and material catalogues as well as a buyers' directory. The apparatus illustrated and described applies, not only to the ceramic industry, but also to the chemical industry. There are the usual number of tables and graphs, all of the same high-standing quality as before.

* * *

TASCHENBUCH FUR DIE FARBEN- UND LACKINDUSTRIE. 8th Edition. Edited by Erich Stock. Stuttgart: Wissenschaftliche Verlagsgesellschaft m.b.H., pp. 556. Rm.14.50.

The startling expansion of the past decade in the range of raw materials for the paint industry and new fields of application for protective and decorative finishes offered by the newer "light" industries places a heavy strain upon paint chemists grappling with the necessary task of keeping up to date in their outlook. It may not be entirely correct to say that the industry is suffering from a surfeit of indigestible raw materials, but the greater variety of resins, solvents, drying oils, driers, plasticisers, emulsifying agents, pigments, etc., is bound to weigh more heavily upon the analytical chemist and formulator in the modern paint factory. Faced with these conditions many paint chemists already using Stock's Pocket Book have reason to be grateful for the vast amount of cogent information on every conceivable aspect of the industry arranged under suitable headings and exhaustively indexed. With this work at his elbow the paint chemist will be spared the trouble of tracking down data otherwise scattered through many text books and trade catalogues. A number of omissions naturally reveal themselves when testing the completeness of the work. In a future edition, the polyhydroxy phenols would merit inclusion as anti-skinning agents for wood oil varnishes. Chlorinated diphenyls are not specifically mentioned as lacquer plasticisers and resins, although a German proprietary material in this class (Clophen) is frequently mentioned without indication of its chemical nature. The only glycollic acid ester to be listed is butyl glycollate; the well-known alkyl phthalyl glycollates are ignored. Aircraft lacquers come in for rather inadequate treatment. Important solvents for which one looks in vain are methyl isobutyl ketone, isopropyl ether and isopropyl acetate.

VDI REVIEW OF GERMAN ENGINEERS' ASSOCIATION (VDI Zeitschrift des Vereins Deutscher Ingenieure). Supplement Technical Processes 1936, No. 1, 2 and 3; 1937, No. 1 and 2. Berlin: VDI-Verlag, G.m.b.H.

The German Engineers' Association, one of the largest engineering organisations in the world, publishes its well-known periodical for all fields of engineering technique. For the last 18 months, supplements entitled "Technical Processes" have been brought out. This is a series for chemical engineers, constructors of apparatus, and for the chemical industry and allied professions in general. The first five publications to appear deal with a large number of constructive, mechanical and technical details in the chemical industry and contain an enormous amount of valuable matter. The chemical industry has advanced, in Germany, in so many different fields much quicker than in Britain, and these supplements therefore deserve special attention because they keep one informed of progress which would not appear in a purely chemical paper.

* * *

THE CHEMISTRY OF NATURAL PRODUCTS RELATED TO PHENANTHRENE. By L. F. Fieser. Second Edition. New York: Reinhold Publishing Corporation. London: Chapman and Hall, Ltd., pp. 456. 35s.

The fields of investigation falling within the scope of this book have been subject to such increased activity and interest during the past year that it has seemed desirable to publish a second edition before such a time as an extensive revision of the text might be needed. To this end, a survey of recent literature has been included in this new edition in the form of an appendix, and the indexes have been extended to accommodate this added material. The revising of the original text has been limited to the correction of typographical errors and to minor changes. The appendix includes references to over 300 papers published in 1936, as compared with about 200 citations to 1935 papers in the first edition. Although 1936 has witnessed the isolation of a few additional natural products, including the highly important vitamin D, the period has been characterised less by dramatic disclosures comparable with those of the preceding years than by the systematic development of the fundamental chemistry of the polynuclear compounds, by the further elaboration of methods of interconversion and of synthesis, and by the general filling in of details to a pattern already clearly outlined.

The Pharmaceutical Industry of India

A Discussion of its Problems

THE problems of the pharmaceutical industry of India, its difficulties, needs and requirements, form the subject of an interesting " Memorandum on the Spirit and Pharmaceutical Industry of India " (pp. 52), prepared by Mr. B. D. Amin, managing director of the Alembic Chemical Works Co., Ltd., Baroda. Nearly every aspect of the industry and every disability it is labouring under is discussed.

The greatest problem of India is her chronic poverty, and the chief task of the Indian pharmaceutical industry is to bring reliable, standard medicines within the purchasing capacity of the people. This task, however, is not an easy one so long as there are factors beyond the control of the industry which militate against the attempts to bring down the cost of production. There are excise restrictions which differ from province to province and create inter-provincial barriers to trade, and also the high excise duty on spirituous medicinal preparations in some provinces, as in Bombay.

Trade in Adulterated Drugs

The consuming public, poor as they are, are naturally drawn by the cheapness of a product, and so long as standard medicines are dear, the public in India generally goes in for the cheaper stuff which is invariably adulterated and often spurious. There is no Drug Act in India, and in the absence of drug control the trade in adulterated and spurious drugs has grown to very large proportions and has become a menace to public health. As an expert who investigated this question remarked, India is the dumping ground for every variety of quack medicines and adultrated drugs manufactured in all parts of the world and her markets are glutted with useless and deleterious drugs sold by unqualified chemists who are themselves a danger. The result of such conditions has been that the development of the pharmaceutical and drug industry of India on right lines has been greatly hindered. Reputed firms who have a real stake in the industry, take immense care to put products of the right quality—manufactured to B.P. standard—on the market; they spend large amounts on research work, and employ well-trained chemists for the purpose. But they are powerless before the inroads made on them by unscrupulous manufacturers and dealers, and are put to a positive disadvantage in the matter of competition.

For the proper development of the pharmaceutical industry on right lines, drug control is absolutely necessary, and although the Indian Drug Enquiry Committee had recommended the Drug and Pharmacy Act for India six years ago action is still delayed. Recently, however, the Government of India passed orders for establishiny a bio-assay standardisation laboratory at Calcutta, which may be the beginning of drug control in India.

Provincial Discrimination

Returning to the consideration of the excise policy, it has to be observed that the importance of spirit as an industrial product of great value and as a base for other industries has not yet been sufficiently recognised in India either by the public or even by the Government, and the excise policy is not sufficiently advanced and is not infused with industrial considerations. Spirituous medicinal preparations, for no reason other than that they contain spirit, are not only subject to high excise duty in certain provinces, but even their transport and movement from one province to another is regulated by a vexatious and dilatory system of import and export permits which impede business and put indigenous products to a disadvantage even as against products imported from Germany and Japan. Imported products, once the tariff duty on them is paid at the port of entry, are subject to no restrictions whatsoever in reard to transport and movement throughout India.

The present memorandum which has been published by the Alembic Chemical Works Co., Ltd., and submitted to the Government of India and to the Provincial Governments with a personal appeal to Lord Linlithgow, discusses in full the various effects and implications of the excise regulations province by province. Bengal is stated to be the only province where excise regulations and duty are of a reasonable character. In Bombay the duty is excessively high, in the Punjab imports of certain spirituous products from other provinces are altogether prohibited and in many other provinces, there is direct or indirect discrimination against products of other provinces. All this has led to great complications which have hindered the progress of the industry.

Uniformity in Excise Rules

The remedy to this state of things is to establish a uniformity in excise duty and excise rules and procedure throughout India. This seems to be all the more necessary in view of the coming inauguration of provincial autonomy under which the present inter-provincial barriers, far from being relaxed, may come to be intensified. The Provincial Governments are at the present time under a statutory obligation to obey the orders and directions of the Government of India, but in future they will be less and less amenable to central control and direction, and the Central Government also will be increasingly reluctant even to offer advice on provincial matters.

For these reasons, the present memorandum suggests that a special conference of the representatives of provincial governments and Indian states should be convened early to consider the question of establishing uniformity in excise rules and arrive at agreements on the question. The specific suggestion made by the Alembic Chemical Works Co., Ltd., is that the Government of India should collect the excise duty at the place of manufacture, and thereafter distribute it among the provinces and states *pro rata*. Once the duty is recovered the transport and movement of the products should be free throughout India, as in the case of products imported from overseas.

British Standard Institution

A Larger Government Grant Needed

REPRESENTATIVES of the Dominions, Government Departments, and other public bodies, and of technical, trade and research organisations in many industries were present at the annual luncheon of the British Standards Institution at the Dorchester Hotel, London, on June 8.

Mr. R. G. Casey, of the Commonwealth of Australia, replying to the toast of " Our Visitors," proposed by Mr. E. J. Elford, the retiring chairman, said that the Institution and its kindred organisation in Australia were typical of British institutions. They were completely voluntary, and there was no obligation to accept the standard specifications they produced, yet those specifications did in practice come into current use and were generally accepted.

Mr. W. Nash, Minister of Finance, New Zealand, said that in his country the standards organisation was almost entirely associated with the Government.

Sir Edward Crowe, Comptroller-General, Department of Overseas Trade, proposed the toast of " The B.S.I.," and he congratulated the Institution on its recent work in South America, and particularly Argentina.

Dr. E. F. Armstrong, the new chairman, in reply, said he hoped that a larger Government grant might one day be made to the Institution, as recommended by the Balfour Committee.

Personal Notes

MR. F. V. RAMSDEN, chief assayer of Rand Refinery, Ltd., Germiston, Transvaal, died in London on April 22.

MR. A. DAVIES, metallurgical chemist at the works of Peter Brotherhood, Ltd., and Miss N. M. Pickering, were married at Peterborough on June 4.

DR. J. H. SCHULMAN is being appointed to the post of second assistant director of research in colloid science at the University of Cambridge.

MR. E. W. REID, of Brussels, is to be the delegate of the American Chemical Society at the Seventeenth Congress of Industrial Chemistry, which is to meet in Paris, September 26 to October 2, 1937.

DR. W. C. PRICE, of John Hopkins University, and Dr. A. E. MOELWYN-HUGHES, of Corpus Christi College, Cambridge, have been appointed university demonstrators in chemistry at Cambridge.

MR. A. E. MARSHALL, of 501 Fifth Avenue, New York, who is well known in the United States as a consulting chemical engineer, is on a visit to Europe. He is spending the greatest part of his time in England and France, but will also make a journey to Belgium and Germany before returning to America during the first week in July.

Pipes for Corrosive Liquids

A New Porcelain of German Origin

A NEW variety of porcelain, known as "Hartporzellan," has been developed by a leading porcelain manufacturer in Germany. The product shows a high degree of resistance to temperature changes and considerable elasticity. It is marketed in tubes 1.5 metres long and with an inside diameter of 10 to 65 mm., and is recommended instead of metal tubing for conveying liquids of all kinds. The tubes have joints, especially developed for the purpose, consisting of rubber pieces placed over the tube ends, and flanged inside to serve as packing. Over these, two conical rings are slipped, with a coupling. By tightening the nuts, the conical rings are made to press against the rubber both in the axial direction and against the sides of the tubes, thus insuring a tight fitting and elastic joint.

The porcelain tubes may be cut to any requisite length by means of a special tool developed for the purpose and resembling the plumbers' pipe-cutter. The tubes are said to be tested at 120 atmospheres pressure and the joints withstand the same pressure. The corrosion resistance of porcelain pipe is unmatched by any metal, since it is resistant to all acids and alkalies and to all solutions of salts; the only chemical that attacks it is hydrofluoric acid. Although Hartporzellan is brittle, it is not as brittle as ordinary porcelain. It is stated that owing to untiring research in the last few years the bending strength of porcelain can be doubled and the impact bending strength increased to 1.5 times. Hartzporzellan is also resistant to sudden changes of temperature up to 150° C.

This porcelain tubing is glazed both outside and in, and is a most hygienic tubing for conveying milk, drinking water, etc. It is intended as a substitute for copper and lead tubing, as Germany experiences an acute shortage of these metals. It is said that the use of porcelain tubing in the chemical industry for conveying corrosive liquids offers much obvious advantages as to require no additional inducement.

PRODUCTION of methanol in the United States during the first quarter of 1937 amounted to 1,572,417 gal. of crude and 5,756,864 gal. of synthetic, according to data prepared by the Bureau of the Census. Crude methanol production in the first quarter of 1936 totalled 1,464,721 gal., and the synthetic variety 4,590,866 gal. In the 1935 first quarter, production of crude methanol aggregated 1,161,584 gal., and the synthetic 3,733,200 gal.

Boots Pure Drug Co., Ltd.

Importance of Research Work

THE 49th annual ordinary general meeting of Boots Pure Drug Co., Ltd., was held at Nottingham on June 4, when Lord Trent, chairman of directors, presided.

Referring to the profit and loss account, Lord Trent said that trading profit, after providing for contributions to staff pensions funds, management remuneration and income-tax, amounted to £966,116. The net balance, after charging these items, amounted to £799,898, an increase of £29,009 over last year, and another company record. After payment of all preference and preferred ordinary dividends, and of four quarterly dividends of 6 per cent., less tax, on ordinary shares, the company had a balance of £319,148, which, together with the balance brought forward, amounts to £617,238, as compared with £550,230 last year. The directors therefore recommended the payment of a bonus of 3d. per share, free of income-tax, on the ordinary shares, absorbing £80,000. They also considered it prudent to recommend a transfer of £100,000 to the general reserve fund, £20,251 to the freehold reserve fund, £50,000 to the contingencies reserve fund, and £50,000 to the overseas development fund, leaving £316,987 to be carried forward.

Mandelic Acid Products

The company's research department, continued Lord Trent, still plays an important part in the work of making the latest discoveries of medical science accessible to the public and in helping to maintain the high standard of quality that the company has set itself. A year ago he referred to the arrangements they had been able to make for presenting mandelic acid in a form that would be palatable and easily administered. The two preparations, Neoket and Ammoket, which were placed on the market have been very successful, and many spontaneous tributes telling of the wonderful efficacy have been received from the medical profession. Another field in which the company's research chemists are active is that of sex hormone therapy, an important branch of modern therapeutics.

With a view to meeting all possible demands for fine chemicals, such as potassium permanganate, and special medical products, such as insulin, the company have again extended their fine chemical factory and have equipped it with the most modern plant.

Export trade is showing very healthy expansion. It has been found necessary to double the number of representatives in India. A market for special medical products is being developed in the Union of South Africa and Rhodesia. Having in view the desirability of letting the new Zealand staff know as much as possible about the company, two qualified chemists have been visiting England for some months learning methods. They have now returned and two other assistants are in England.

An Excess of Legislation

The country is suffering to-day from an excess of well-meant legislation, continued Lord Trent. Every law that imposes any kind of compulsion or restriction on trade involves expense that obstructs the trend to lower prices. Any modification of an existing law may have a similar effect. What might appear to some a small matter, as, for instance, a change of labels under the Poisons Act, caused an expenditure for Boots Pure Drug Co. alone of many thousands of pounds. Those who are responsible for drafting laws affecting industry have not, as a rule, the necessary knowledge or experience to appreciate what their effects will be. The advice of people competent to estimate the practical effect of the laws should be sought at every stage.

Mr. G. M. Gales and Mr. W. E. Weiss retired from the board by rotation, and were re-elected.

Mr. E. L. B. Thomas, who was appointed when Mr. H. R. Gillespie died, retired in accordance with article 86 of the articles of association, and was also re-elected.

Seeking Oil in Sussex

Efforts of the Anglo-American Oil Co.

ON June 4, Lord Apsley, Parliamentary Secretary to the Ministry of Defence, set in motion the machinery which officially marked the opening of the first operations by the Anglo-American Oil Co. to discover oil in this country. The test well is at Grove Hill, near the village of Hellingly, Sussex.

At a luncheon which followed the opening ceremony, Mr. F. J. Wolfe, chairman of the Anglo-American Oil Co. announced that while this particular drilling operation was confined to but a few acres the company had licences for drilling on approximately 500 square miles and had lodged applications for new licences covering a further 2,200 square miles. It was indended to make every effort to provide Great Britain with one of her most vital needs—an independent supply of crude oil. They had found that suitable conditions existed in the South of England, in the Midlands, and in Scotland. Narrowing down their research they had discovered that one of the most promising areas was Grove Hill. This area was approximately three-quarters of a mile wide and eight miles long. It rose to a height of more than 150 ft. and was closed in on all sides, thus forming an ideal trap for oil or gas which might have migrated on the surface of those great bodies of water known to exist deep below the earth's surface. It was possible that many millions of gallons of oil might be found.

Lord Apsley said that Sir Thomas Inskip was prevented from being present at the ceremony as he had to attend the Imperial Conference.

40-Hour Week for Chemical Industry

Conditions in the Soviet Union

THE workers' group secured a success at the International Labour Conference at Geneva, on June 5, on a proposal of the group that the single discussion procedure should be adopted for the question of the forty-hour week in the chemical industry so as to make it possible for conventions to be adopted by this industry at the present session of the conference.

M. Baron (French Government) strongly supported the adoption of a convention for the chemical industry at the present session of the conference. The French Government, he said, was proud of having introduced in its own country legislation for the reduction of hours of work to 40 in the week in nearly every industry—in commerce, in transport, in offices, and in hospitals, and various other undertakings. In the chemical industry that reform was introduced on March 4, 1937, and they had found scarcely any difficulty in applying it, thanks to the collaboration of all the parties concerned. It was, however, necessary for the sake of national industry, for the sake of the workers, and for the sake of world peace that France should not be left alone in that situation.

M. Sobol (Soviet workers) said that seven hours was now the maximum number per day in the Soviet Union for workers in all branches of industry. Twenty per cent. of the workers had one rest day after every four days' work and 80 per cent. had one day after every five days' work. When one considered that all employed persons in the Soviet Union had an annual paid holiday of from a fortnight to a month and when one took into account public holidays also it would be seen that the hours of work were something like 37 or 38 in the week.

In dangerous and unhealthy operations hours were still shorter. In the chemical industry 28 per cent. of the workers engaged in aniline dye processes were working a day of six hours or even less, and the same applied to the metal industry.

Oil and Colour Chemists

Dr. G. F. New Re-elected President

NEARLY 100 members of the Oil and Colour Chemists' Association attended the first conference of the Association at the Palace Hotel, Buxton, May 27-29. There were three sessions, at the first of which Dr. M. Polanyi, of Manchester University, gave a discourse on "Colours as Catalysts;" at the second session Dr. H. B. Footner read a paper on "The Preparation of Steelwork for Painting," and at the third session there was a series of complementary papers on "Pigment Vehicle Relationship."

Dr. G. F. New was re-elected president of the Association. In the course of his address at the annual general meeting, he said that he was very strongly of the opinion that the technical staffs of the paint, colour and varnish industries will be best served by one comprehensive organisation, and to this end he would continue to direct his efforts, supported very ably, he knew, by those members who were in agreement with the proposals.

Formation of London Section

The time appears to have arrived when a further slight reorganisation of the working mechanism of the Association is necessary. In the early days, the Council of the Association was concerned almost entirely with arrangements on behalf of the members within easy reach of London. Since that time, the growth of the Association has involved the extension of the Council activities to the care of the interests of the Manchester and Scottish sections, and these and other matters pertaining to the association as a whole, have become progressively more important in relation to the matters concerning the London area alone. The desirability of the formation of a London section to care for the interests of the London members with the same assiduity and detailed attention as is enjoyed by the members of the Manchester and Scottish sections, has been in the minds of some of the officers of the association for some time. The matter was brought forward very aptly in a communication from the Manchester section early this year, suggesting that it was desirable that a London section should be formed and that the duties and responsibilities of the Council itself, and of the section committees, should be redefined. It was also suggested that members should automatically become attached to the section which is nearest to their residence or place of employment, unless they express the wish otherwise.

These suggestions have been very fully discussed both within and without the Council, and as far as the Council itself is concerned, a substantial majority are completely in favour of the proposed change. It has many things in favour of it besides the more detailed attention which the London members may be expected to receive from a local section committee of their own. As a step in administration there is no question that it is good.

Confidential Trade Information

Continuing, Dr. New said he thought the time was coming when firms who appreciate the value of the Association to their staffs in making discussions and widening their knowledge, may have to consider whether they cannot go further than they have in the past towards releasing information previously regarded as confidential for general discussion. There was no doubt whatever, that if the membership as a whole could enjoy such increased facilities for discussion, the membership as a whole would benefit very greatly. There was equal certainty that a retarding factor is the fear on the part of most firms that through open discussion by their staff, they may give away more than they receive. In many cases, however, it must frankly be admitted, that secrecy has a very high commercial value, but in very many others there is no doubt that discussion of secret processes would reveal that not only were they not secrets, but that they were capable of considerable improvement.

Oil from British Coal

Wider Development of Low Temperature Carbonisation Needed

THE contribution that British coalfields could make to the home supply of oil and petrol was examined by Colonel W. A. Bristow, chairman of the Low Temperature Coal Distillers' Association of Great Britain, in a paper read before the Fuel Luncheon Club on June 2.

Colonel Bristow said that an initial payment of about £60,000,000 would provide enough plant to carbonise the whole of the domestic fuel used in this country. From this amount of coal we should derive about 5,000,000 tons of oil and petrol. For the last two years a campaign had been waged against the coal-oil industry on the ground that it was non-economic. A statement had been made that for every gallon of petrol produced in England the Treasury lost eightpence, which meant that the country lost eightpence. Such suggestions were absurd. Imported oil itself paid nothing in duty. The money paid to the Exchequer was derived from the whole community, and oil was merely one of the levers by which the Chancellor of the Exchequer extracted from our pockets every year the amounts necessary to run the country. If the revenue were not derived from oil, the money would be taken on some other commodity or taxable basis. "Great Britain and the Empire have been made by coal," Colonel Bristow added, "and their future and their fortune are to-day more vitally linked up with our coal resources than ever before in our history. Our methods of winning coal, the organisation of our mines and the preparation and marketing of the product are second to none. In my opinion, the all-round requirements of this country are such that any process that is now being operated here on a commercial scale from the recovery of oil from coal is undoubtedly economic within the real meaning of the term."

Expansion in Steel Making

Changes in Methods of Production

SIGNIFICANT trends in production methods are revealed in statistical tables for 1936 which have been published by the British Iron and Steel Federation. These tables form an advance release from the 300-page annual year-book of the Federation which will appear in the autumn. Owing largely to the expansion of completely integrated plants combining blast and steel furnaces, steelmakers' consumption of their own pig-iron and scrap metal increased from 51.6 per cent. to 53.2 per cent. (comparing 1935 and 1936), and the use of pig-iron and scrap bought from outside firms declined correspondingly. The total "internal" consumption of steelmaking materials rose by 1,225,000 tons, and outside purchases increased by one 778,000 tons.

An important change took place during 1936 in the relations of blast furnace metal to scrap in the steel furnace burden as a result of the increasing scarcity of steel scrap from mid-summer onwards. In 1935, the average 10-ton ingot contained 5.92 tons of scrap and 4.66 tons of pig-iron and/or hot metal. In 1936, these proportions had altered to 5.87 and 4.72 tons respectively. The change indicated was engendered as the result of a rise in scrap prices of the order of 10 per cent., and allows for the fact that some 40 per cent. of the scrap content is automatically produced within makers' works. The greater use of blast furnace iron represented a saving of some 60,000 tons of iron and steel scrap which would otherwise have had to be imported.

The correspondingly higher pressure on blast furnace production gave rise to interesting economies in actual performance, but caused serious problems as to coke and iron-ore supplies. Only 55.81 cwt. of burden, against 56.33 cwt. in 1935, were required per ton of pig-iron. Progress in fuel efficiency is reflected in the fall from 33.58 to 33.16 cwt. of coal equivalent burned, due largely to more modern coke-oven practice. High freights and the difficulty of quickly enlarging foreign sources of supply, however, threw this load on to domestic ironstone mines. The additional 1,297,000 tons of pig-iron smelted in 1936 required 2,786,000 more tons of iron-ore. Of this need British mines satisfied 1,750,000 tons, and foreign mines 1,000,000 tons.

Problem of Ore Supplies

The figures now released bear topically on the question of ore supplies within the Empire, raised recently in the House of Commons. It is seen that supplies from Newfoundland, the Labrador coast and Sierra Leone have tripled in the last two years alone. In England, rapid expansion is taking place in the Oxfordshire and Northants fields. Of the 1,800,000 tons higher output of home mines in 1936, these districts contributed nearly half. At the same time, the comparatively low iron content of those ores necessitated a higher consumption of coke in the blast furnace and tended to aggravate the coke shortage. In view of the gradual working out of the valuable hematite iron deposits in Cumberland, and the corresponding decline in production over recent years, however, the reversal of this process in 1936 was the more satisfactory. Output increased from 708,000 to 750,000 tons.

Foreign Chemical Notes

Japan

CONSTRUCTION OF A NEW SULPHURIC ACID PLANT has been commenced at Amagasaki by the Asahi Kagahu Hiryo K.K.

Italy

TWO NEW ALUMINIUM FACTORIES have commenced working at Porto Marghera and Bozen Aluminium powder is among the products to be made.

Roumania

A PLANT FOR EXTRACTING SULPHUR from the waste gases of smelting plants is being installed at the State Mines in Transylvania and will have a daily output of 7 tons sulphur.

Hungary

SODIUM HYDROXIDE AND CHLORINE are now being produced at the new works of the Hungaria Artificial Fertiliser, Sulphuric Acid and Chemical Industry Co., in the respective annual outputs of 4,000 tons and 3,400 tons. Rock salt is the starting material which is electrolysed in mercury silver cells by the Solvay process.

China

THE FIRST CALCIUM CARBIDE FACTORY in China was started up at the beginning of this year by the Chinese Industrial Gas Co. Chinese interests are now considering erection of a second factory at Hangchow in the province of Chekiang. At present the chief importing country is Japan (total imports for 1936 were 3,800 tons).

Austria

A PETROLEUM PROSPECTING CONCESSION has been acquired by the Italian Agip Petroleum Co. at a site in Lower Austria. Although very little crude oil has hitherto been produced in this region, the output has sharply increased recently, the 1932 figure of 120 tons comparing with 7,500 tons in the past year, while 6,500 tons were produced in the first 6 weeks only of the present year.

Russia

COBALT DEPOSITS at Daschkessansk are to be exploited by the Solotorasvedka Trust, and a concentrating plant is expected to be operating in August.

PHENOL-FORMALDEHYDE RESINS for railway coach paints are being tried out at the Jegorev factory. Compared with a drying time of 1 to 3 days for the varnishes, hitherto in use for this purpose, the new products dry in 12 hours.

References to Current Literature

British

RUBBER.—Woodflour in rubber compounding. H. Barron, *Rubber Age, 18,* 119-121.

BLEACHING.—Bleaching silk: Practical points on peroxide methods. C. C. Downie, *Silk Rayon, 11,* 536.

CERAMICS.—Some effects of soluble salts in clay products. B. Butterworth, *Trans. Ceramic Soc., 36,* 233-242.

ORGANIC.—Derivatives of salicylic acid: Brom-salicylic acids and their methyl ethers. N. W. Hirwe and B.V. Patil, *Proc. Indian Acad. Sciences, 5,* A, 321-325.

Formaldehyde condensation with aliphatic ketones: Methyl ethyl ketone. G. T. Morgan and C. F. Griffiths, *J.C.S.*, 1937, 841-844.

ANALYSIS.—Observations on the chemical determination of adrenaline. J. Devine, *Biochem. J., 31,* 545-550.

OILS.—Recent and future developments in petroleum refining. R. Simard, *Chem. and Ind., 56,* 520-526.

Catalytic polymerisation in monolayers of drying oils. G. Gee and E. K. Rideal, *J.C.S.*, 1937, 772-778.

DYEING.—Prussiate aniline black dyeing. "Ager," *Tept. Mercury, 96,* 592-593.

MISCELLANEOUS.—The uses of synthetics in perfumery: Aldehydes and related bodies. M. Lovatt-Hewitt, *Perfumery Essential Oil Rec., 28,* 167-171.

American

POLYMERISATION.—Mechanism of thermal polymerisation and polycondensation. H. Dostall, H. Mark and R. Raff, *Ind. Eng. Chem., 29,* 595-599.

CELLULOSE.—The chemical composition of wood. W. G. Van Beckum and G. J. Ritter, *Paper Trade J., 104,* No. 19, 49-50.

CERAMICS.—Talc in whiteware. R. F. Geller and A. S. Creamer, *J. Amer. Ceramic Soc., 20,* 137-147.

CATALYSTS.—New metal halide catalysts for hydrocarbon reactions. A. V. Grosse and V. N. Ipatieff, *J. Org. Chem., 1,* 599-566.

OIL.—Motor fuel from oil cracking: Production by the catalytic water-gas reaction. G. Egloff, E. F. Nelson and J. C. Morrell, *Ind. Eng. Chem., 29,* 555-559.

RUBBER.—The use of bentonite in rubber. W. B. Hirschmann, *Rubber Age, 41,* 89-92.

ANALYSIS.—The analysis of buffering compounds. F. E. De Vries, *Chem. Analyst, 26,* 32.

The determination of silicon in aluminium and aluminium alloys. H. V. Churchill, R. W. Bridges and M. F. Lee, *Ind. Eng. Chem. anal. edit., 9,* 201-202.

The determination of tar acids and bases by extraction methods. C. H. Fisher and A. Eisner, *Ind. Eng. Chem. anal. edit., 9,* 213-218.

DYEING.—The micellar structure of rayon in relation to dyeing: Newly developed theories in scouring and dyeing. H. H. Mosher, *Rayon Text. Monthly, 18,* 53-54.

INORGANIC.—Nepheline syenite. R. B. Ladoo, *Glass Ind., 18,* 204-206.

PAPER PULP.—Determining the cuprammonium viscosity of pulp. F. A. Ennevaara, *Paper Trade J., 104,* No. 18, 45-46.

SOAP.—The determination of free alkali in soaps. H. Peters, *Textile Colorist, 39,* 319.

German

PAINTS.—Modern methods for the testing of paint films. E. Rossmann, *Fette u. Seifen, 44,* 136-139.

OILS.—Selective solvent refining. G. Free, *Oel u. Kohle, 13,* 420-426.

The removal of sulphur from mineral and tar oils. F. Muhlert, *Chem.-Ztg., 61,* 475-478.

ANALYSIS.—The determination of arsenic and antimony in organic compounds and mixtures. E. Schulek and R. Wolstadt, *Z. analyt. Chem., 108,* 400-406.

Colorimetric determination of silicic acid in the presence of iron, phosphorus and fluorine. I. P. Alimarin and V. S. Zoerev, *Mikrochemie, 22,* 89-101.

The analysis of chrome ironstones and chromium-containing fireproof materials. W. Erber, *Angew. Chem., 50,* 382-383.

SAPONIFICATION.—The catalytic saponification of fatty oils by means of alcoholic caustic potash. H. Kurz, *Fette u. Seifen, 44,* 144-145.

Simplifying the determination of the saponification number. J. Hübscher, *Seifensieder-Ztg., 64,* 315-316.

PLASTICS.—Safety glass. F. H. Zschacke, *Gelatine Leim Klebstoffe, 5,* 48-56.

POLYMERISATION.—Principle points of view concerning polymerisation processes. D. Dreher, *Kunststoffe, 27,* 137-143.

INORGANIC.—Rhodium and its technical applications. O. Brunck, *Chem.-Ztg., 61,* 433-435.

On ferrophosphorus. F. F. Henglein and K. Stoeckhert, *Angew. Chem., 50,* 380-382.

WOOD.—Recent investigations on the lignins of various kinds of wood. E. W. Wedekind, *Papier Fabrikant (techn. Teil), 35,* 141-142.

RUBBER.—The accelerated vulcanisation of rubber. T. Greness, *Gummi-Ztg., 51,* 502-503.

ADHESIVES.—Hydrogen peroxide and persulphates in the glue and adhesives industries. F. Ohl, *Gelatine Leim Klebstoffe, 5,* 45-48.

VARNISH.—Contribution to the analysis of oil varnishes. C. P. A. Kappelmeier, *Farben-Ztg., 42,* 535-536.

TANNING.—On the tanning action of sulphite cellulose extracts. W. Grassmann, A. Miekely, H. Schelz and V. Windbichler, *Collegium,* 1937, No. 3, 136-152.

SOAP.—The preparation of soap flakes by the addition of water-free spreading agents. "Oculus," *Seifensieder-Ztg., 64,* 296-297.

French

BLEACHING.—The effective utilisation of sodium perborate as a bleaching agent. L. Bonnet, *Teintex, 2,* 288-289.

OILS.—The characteristics of various decolorising earths in the decolorising of different oils. E. Erdheim, *Matières Grasses Pétrole Dérivés, 29,* 114-117.

PAINTS.—Study of the structure of paints: The role of pigments and oils, recent researches and results. *Rev. Produits Chim., 40,* 257-262.

Chlorinated caoutchouc and its applications: Paints and varnishes containing chlorinated caoutchouc. *Peintures Pigments Vernis, 14,* 56-57.

TEXTILE FINISHES.—Sulphonated fatty alcohols in hot baths V. Pflumm, *Teint. Imp. Blanch. App., 15,* 239-243.

POLYMERISATION.—Considerations, theories and practices in the obtaining of petrol by polymerisation. R. Fussteig, *Chim. et Ind., 37,* 853-860.

TANNING.—The electronic theory of tanning: Phosphate tanning. J. A. Wilson, *Cuir Technique, 30,* 132-141.

WATER.—The purification of industrial water. J. Rolland, *Teintex, 2,* 196-198, 265-269.

DYEING.—Some researches on logwood black for dyeing silk. F. Weber, *Melliand Textilber, 18,* 448.

ORGANIC.—Isothymol. H. Janistyn, *Deutsche Parfümerie Ztg., 23,* 176.

MISCELLANEOUS.—Processes and apparatus for the estimation of fogs, smokes and dusts. A. Czernotzky, *Chem.-Fabrik, 10,* 218-220.

PAPER.—Metallic particles in paper. P. Goldsmith, *Papier, 40,* 315-320.

INORGANIC.—Industrial processes for the separation of iron from solutions of aluminium sulphate by means of manganous acid. I. Fazzioli, *Chim. et Ind., 37,* 861-862.

ANALYSIS.—The microchemical identification of tellurium. G. Denigès, *Compt. rend., 204,* 1,256-1,258.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the London market for general heavy chemicals, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates. Unless otherwise stated, the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Activity on the Manchester chemical market during the past week so far as actual new business is concerned has been on only a relatively moderate scale. In some directions, however, buyers are showing a little more interest with regard to contracts covering requirements over the second half of the year. On the whole, users continue to call for good quantities of the principal bread-and-butter lines, although here and there a very slight diminution in the quantities of textile chemicals that are being taken up has been reported. Market prices generally remain on a steady to firm basis. In the by-products market there has been little change in conditions compared with a week ago. Supplies of most descriptions are being readily absorbed, especially of carbolic acid and the light distillates, and with odd exceptions quotations keep firm, with here and there a rising tendency.

GLASGOW.—There has been a steady day to day demand for chemicals for home trade during the week, but export business has remained rather quiet. Prices generally continue firm at about previous figures with only slight changes to report. Latest reports from the coal tar products market indicate somewhat quieter trading conditions during the week, although inquiries are fairly numerous and prices remain steady in most departments. Carbolic and cresylic acids are moving well, but in the absence of any fresh business transactions of moment, prices remain as last quoted. Naphthalene continues very steady, and the firelighter quality appears particularly active for the season. A certain amount of new business in creosote has been booked, but generally manufacturers still show a marked disinclination to enter upon long term contracts for virgin oils.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

ACID, CHROMIC.—9¼d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 10s. to £55 per ton ex store.

ACID, SULPHURIC.—168° Tw., £4 5s. to £4 15s. per ton; 140° Tw., arsenic-free, £2 15s. to £3 5s.; 140° Tw., arsenious, £2 10s.

ACID, TARTARIC.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2¼d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £16 10s. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—£55 10s. per ton.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish, £17 10s., ex store.

BARIUM CHLORIDE.—£10 per ton. GLASGOW: £11 5s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 10s. per ton net ex store.

CHROMETAN.—Crystals, 2¼d. per lb.; liquor, £19 10s. per ton d/d

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. GLASGOW: 99%, £4 7s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LEAD ACETATE.—LONDON: White, £35 10s. per ton; brown, £35. GLASGOW: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36 10s.; brown, £35 10s.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—SCOTLAND: £38 per ton, less 2½%, carriage paid for 2-ton lots.

LEAD (WHITE SUGAR OF).—GLASGOW: £37 per ton net, ex store.

LITHARGE.—SCOTLAND: Ground, £37 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

PHENOL.—7¾d. to 8½d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., less 5%, carriage paid.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £38 per ton.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¾d. per lb. SCOTLAND: B.P. Crystals, 9¾d. MANCHESTER: B.P. 11d. to 1s.

POTASSIUM PRUSSATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d. to 6¾d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. GLASGOW: Large crystals, in casks, £38.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £12 15s. per ton in 1 cwt. kegs, £11 per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., less 5% carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHATE.—Commercial, 2 ton lots d/d, £10 5s. per ton; photographic, £14 5s. MANCHESTER: Commercial, £10; photographic, £14 10s.

Sodium Metasilicate.—£14 per ton, d/d U.K. in cwt. bags.
Sodium Nitrate.—Refined, £7 15s. per ton for 6-ton lots d/d.
Sodium Nitrite.—£18 5s. per ton for ton lots.
Sodium Perborate.—10%, 9½d. per lb. d/d in 1-cwt. drums.
Sodium Phosphate.—£13 per ton.
Sodium Prussiate.—4d. per lb. for ton lots. Glasgow: 5d. to 5¾d. ex store. Manchester: 4d. to 4½d.
Sodium Silicate.—£9 10s. per ton.
Sodium Sulphate (Glauber Salts).—£3 per ton d/d.
Sodium Sulphate (Salt Cake).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. Scotland: Ground quality, £3 5s. per ton d/d. Manchester: £3 10s.
Sodium Sulphide.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. Manchester: Concentrated solid, 60/62%, £11; commercial, £8.
Sodium Sulphite.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
Sulphate of Copper.—£20 per ton, less 2%, in casks. Manchester: £22 10s. per ton f.o.b. Scotland: £24 10s. per ton less 5%, Liverpool, in casks.
Sulphur Precip.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
Zinc Sulphate.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

Antimony Sulphide.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.
Arsenic Sulphide.—Yellow, 1s. 5d. to 1s. 7d. per lb.
Barytes.—£6 to £7 10s. per ton, according to quality.
Cadmium Sulphide.—7s. 7d. to 8s. per lb.
Carbon Bisulphide.—£31 to £33 per ton, according to quantity, drums extra.
Carbon Black.—3 11/16d. to 4 13/16d. per lb., ex wharf.
Carbon Tetrachloride.—£41 to £46 per ton, according to quantity, drums extra.
Chromium Oxide.—Green, 1s. 2d. per lb.
Diphenylguanidine.—2s. 2d. per lb.
India-rubber Substitutes.—White, 4½d. to 5d. per lb.; dark, 3¾d. to 4¼d. per lb.
Lamp Black.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
Lead Hyposulphite.—9d. per lb.
Lithopone.—30%, £16 10s. to £17 5s. per ton.
Sulphur.—£9 to £9 5s. per ton. Sulphur precip. B.P., £55 to £60 per ton. Sulphur precip. comm., £50 to £55 per ton.
Sulphur Chloride.—5d. to 7d. per lb., according to quantity.
Vermilion.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
Zinc Sulphide.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

Sulphate of Ammonia.—Neutral quality, basis 20.6 per cent. nitrogen, delivered in 6-ton lots to farmer's nearest station, £7 5s. per ton.
Calcium Cyanamide.—£7 5s. per ton, carriage paid to any railway station in Great Britain in lots of four tons and over.
Nitro-Chalk.—£7 5s. per ton for delivery to end of June.
Nitrate of Soda.—£7 12s. 6d. per ton for delivery up to end of June.
Concentrated Complete Fertilisers.—£10 12s. to £11 1s. per ton delivered in 6-ton lots to farmer's nearest station.
Ammonium Phosphate Fertilisers.—£10 5s. to £13 15s. per ton for delivery up to end of June, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

Acid, Cresylic.—97/99%, 5s. 3d. to 5s. 5d. per gal.; 99/100%, 5s. to 6s., according to specification; pale 99%, 5s. 6d. to 5s. 8d.; dark, 4s. 8d. to 4s. 10d. Glasgow: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. 4d. to 2s. 8d. American specification, 4s. 3d. to 4s. 6d. Manchester: Pale, 99/100%, 5s. to 5s. 3d.
Acid, Carbolic.—Crystals, 7¾d. to 8¼d. per lb.; crude, 60's, 4s. 3d. to 4s. 6d. per gal. Manchester: Crystals, 8¼d. per lb. f.o.b. in drums; crude, 3s. 10d. per gal. Glasgow: Crude, 60's, 3s. 9d. to 4s. per gal.; distilled, 60's, 4s. 3d. to 4s. 6d.
Benzol.—At works, crude, 10d. to 10½d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d.; pure, 1s. 8½d. to 1s. 9d. Glasgow: Crude, 10d. to 10½d. per gal.; motor, 1s. 5d. to 1s. 5½d.
Creosote.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3¾d. d/d. London: 4½d. f.o.r. North: 5d. London. Manchester: 5½d. to 6½d. Glasgow: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5½d. to 5¾d.; lower sq. gr. oils, 5½d. to 5¾d.
Naphtha.—Solvent, 90/160%, 1s. 7d. to 1s. 8d. per gal.; 95/160%, 1s. 8d. to 1s. 9d.; 90/190%, 1s. 2d. to 1s. 3d. London: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. Glasgow: Crude, 6d. to 6¾d. per gal.; 90% 160, 1s. 6½d. to 1s. 7½d., 90% 190, 1s. 1d. to 1s. 2d.
Naphthalene.—Crude, whizzed or hot pressed, £10 10s. to £11 10s. per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. London: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. Glasgow: Fire lighter, crude, £6 to £7 per ton (bags free). Manchester: Refined, £22 per ton f.o.b.
Pyridine.—90/140%, 9s. to 9s. 6d. per gal.; 90/180, 2s. 9d. to 3s. 6d. Glasgow: 90% 140, 9s. to 10s. per gal.; 90% 160, 7s. to 8s.; 90% 180, 2s. 6d.
Toluole.—90%, 2s. 1d. per gal.; pure, 2s. 6d. to 2s. 7d. Glasgow: 90%, 120, 1s. 10d. to 1s. 11d. per gal.
Pitch.—Medium, soft, 36s. to 37s. per ton, in bulk at makers' works. Manchester: 35s. f.o.b., East Coast. Glasgow: f.o.b. Glasgow, 32s. to 37s. per ton; in bulk for home trade, 32s. 6d.
Xylol.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. Glasgow: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

Acetate of Lime.—Brown, £8 5s. to £8 15s. per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. Manchester: Brown, £9 10s.; grey, £11 10s.
Charcoal.—£6 5s. to £12 per ton, according to grade and locality.
Methyl Acetone.—40-50%, £42 to £45 per ton.
Wood Creosote.—Unrefined 6d. to 1s. per gal., according to boiling range.
Wood, Naphtha, Miscible.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.
Wood Tar.—£3 to £4 per ton.

Intermediates and Dyes

Acid, Benzoic, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.
Acid, Gamma.—Spot, 4s. per lb. 100% d/d buyer's works.
Acid, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
Acid Naphthionic.—1s. 8d. per lb.
Acid, Neville and Winther.—Spot, 3s. per lb. 100%.
Acid, Sulphanilic.—Spot, 8d. per lb. 100%, d/d buyer's works.
Aniline Oil.—Spot, 8d. per lb., drums extra, d/d buyer's works.
Aniline Salts.—Spot, 8d. per lb. d/d buyer's works, casks free.
Benzidine, HCl.—2s. 5d. per lb., 100% as base, in casks.
m-Cresol 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.
o-Cresel 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.
p-Cresol 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.
Dichloraniline.—1s. 11½d. to 2s. 3d. per lb.
Dimethylaniline.—Spot, 1s. 6d. per lb., package extra.
Dinitrobenzene.—7½d. per lb.
Dinitrochlorbenzene, Solid.—£72 per ton.
Dinitrotoluene.—48/50° C., 8½d. per lb.; 66/68° C., 10d.
Diphenylamine.—Spot, 2s. per lb., d/d buyer's works.
α-Naphthol.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-Naphthol.—9½d. to 9¾d. per lb.; flake, 9½d. to 9¾d.
α-Naphthylamine.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.
β-Naphthylamine.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.
o-Nitraniline.—3s. 11d. per lb.
m-Nitraniline.—Spot, 2s. 7d. per lb., d/d buyer's works.
p-Nitraniline.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.
Nitrobenzene.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.
Nitronaphthalene.—9d. per lb.; P.G., 1s. 0½d. per lb.
Sodium Naphthionate.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.
o-Toluidine.—10½d. per lb., in 8/10-cwt. drums, drums extra.
p-Toluidine.—1s. 10½d. per lb., in casks.
m-Xylidine Acetate.—4s. 3d. per lb., 100%.

Latest Oil Prices

London, June 9.—Linseed Oil was firm. Spot, £32 5s. per ton (small quantities); June and July-Aug., £29 15s.; Sept.-Dec., £29 12s. 6d.; Jan.-April, £29 15s., naked. Soya Bean Oil was steady. Oriental (bulk), afloat, Rotterdam, £25 per ton. Rape Oil was slow. Crude, extracted, £36 per ton; technical refined, £37, naked, ex wharf. Cotton Oil was dull. Egyptian, crude, £28 per ton; refined common edible, £31 10s.; deodorised, £33 10s., naked, ex mill (small lots £1 10s. extra). Turpentine was quiet. American, spot, 37s. 6d. per cwt.

Hull.—Linseed Oil.—Spot, quoted £30 5s. per ton; June and July-Aug., £29 15s.; Sept.-Dec. and Jan.-April, £29 12s. 6d. Cotton Oil.—Egyptian, crude, spot, £27 10s. per ton; edible, refined, spot, £30 10s.; technical, spot, £30 10s.; deodorised, £32 10s., naked. Palm Kernel Oil.—Crude, f.m.q., spot, £26 per ton, naked. Groundnut Oil.—Extracted, spot, £32 per ton; deodorised, £35. Rape Oil.—Extracted, spot, £35 per ton; refined, £36. Soya Oil.—Extracted, spot, £31 10s. per ton; deodorised, £34 10s. Cod Oil.—F.o.r. or f.a.s., 27s. 6d. per cwt. Castor Oil.—Pharmaceutical, 44s. per cwt.; first, 39s.; second, 37s. Turpentine.—American, spot, 39s. 9d. per cwt.

From Week to Week

THE NOMINAL CAPITAL of The Sheppey Glue and Chemical Works, Ltd., 34 Mark Lane, E.C.3, has been increased by the addition of £25,000 beyond the registered capital of £60,000. The additional capital is divided into 2,500 "B" ordinary shares of £10 each.

WORLD PRODUCTION OF LEAD (exclusive of Spain) during April, as reported by the American Bureau of Metal Statistics, was 151,600 tons, compared with 146,700 tons (exclusive of Italy and Spain) in March. Production in America amounted to 43,900 tons, against 41,200 tons in March.

THE UNITED KINGDOM PAVILION at the Paris International Exhibition will be formally opened by the Lord Mayor of London, Sir George Broadbridge, on Saturday, June 19. The principal exhibits are articles made in the ordinary course of everyday manufacture and they have been selected by the Council for Art and Industry.

AN AVERAGE OF OVER 18 DWT. OF "PLATINOIDS" PER TON has been obtained from an assay of three samples of ore taken from the neighbourhood of the Ingandomo River, in the Lower Gwelo area of Rhodesia. The find was made in a local dyke formation distinct from the Great Dyke through which the Ingandomo River flows.

REPRESENTATION HAS BEEN MADE to the Board of Trade under Section 10(5) of the Finance Act, 1926, regarding phenol (synthetic). Any communications should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade, Great George Street, London, S.W.1, not later than June 22.

CHEMICAL AGE LAWN TENNIS TOURNAMENT.—Mr. I. Williams, of Monsanto Chemicals, Ltd., Ruabon, Denbighshire, beat Mr. R. D. Hayman, of Doulton and Co., 120, Granville Street, Birmingham, by 6—1, 6—4, in the first round of THE CHEMICAL AGE Lawn Tennis Tournament, on June 4. The winner is drawn to meet Mr. P. A. Tunstall, of The Salt Union, Ltd., in the second round. This result is additional to those already announced.

IT IS ANNOUNCED BY BOOTH'S DISTILLERIES, LTD., that the directors have accepted an offer from the Distillers Co. for the purchase of the whole of the £200,000 6½ per cent. cumulative preferred ordinary stock and £600,000 ordinary stock issued by Booth's Distilleries. The offer consists of 28s. 6d. for each £1 of 6½ per cent. cumulative preferred stock and 50s. in respect of each £1 ordinary stock—payable in cash in both instances. The directors recommend the shareholders to accept the offer.

THE BOARD OF TRADE HAS RECEIVED APPLICATIONS for a licence to import free of duty a form of hydrometer in which a sealed float, to which is attached a compensating chain, rises in a graduated cylindrical glass vessel to a height proportional to the density of the liquid. Any representations that a similar instrument is made, or is likely to be made within a reasonable time, in the United Kingdom or elsewhere in the Dominions, should be addressed to the Principal Assistant Secretary, Industries and Manufactures Department, Board of Trade.

EXISTENCE OF AN UNSURVEYED HELIUM GAS FIELD in East Central Nebraska, six miles north of Columbus, was announced at Lincoln, Nebraska, by Dr. G. E. Condra, director of the Conservation and Survey Division of the University of Nebraska. Dr. Condra said helium was first noted in gas escaping from a well in that vicinity five or six years ago, but that the helium content of the gas was purposely kept a secret. Virtually all known deposits of helium are in the United States. The possibilities of producing helium gas in the Northern Brazilian State of Parahyba do Norte, however, are being investigated.

MEMBERS OF THE AGRICULTURAL AND FOREST SERVICES of the Empire Overseas, who visited Rothampsted Experimental Station, Harpenden, on June 3, under the auspices of the Imperial Bureau of Soil Science, were addressed by Viscount Bledisloe, who said that £10,000 spent on soil research might lead to a benefit of half a million pounds to the country. In celebration of the centenary, six years hence, of the research station, which is the oldest in the country, Viscount Bledisloe suggested that £100,000 should be forthcoming from every part of the Empire in order to give it a good endowment to carry on its activities.

BRITISH COAL DISTILLATION, LTD., have now completed their arrangements with B. A. Collieries, Ltd., for the erection of distillation plant utilising the Suncole Process and capable of distilling 450 tons of coal per day. It is expected that the new plant will be in full working order in time to meet the winter trade of 1938. To operate the plant a new company to be known as Suncole (Nottingham), Ltd., will be constituted under the auspices of B. A. Collieries, Ltd., and British Coal Distillation, Ltd., and three directors of the latter company will be appointed to the board of the new company. When in full operation the new plant will produce 93,000 tons of Suncole smokeless fuel and 1,500,000 gallons of crude oil and motor spirit per year.

IMPERIAL CHEMICAL INDUSTRIES, LTD., London, have contributed £200 to the Falkirk and District Royal Infirmary Nurses' Home Appeal.

THE POTTER DRUG AND CHEMICAL CORPORATION, of Boston, makers of "Cuticura" soap, ointment, and talcum powder, are to start manufacturing in the Irish Free State.

COMMUNICATIONS for the Hon. Assistant Secretary of the Electrodepositors' Technical Society (Captain A. I. Wynne-Williams) should now be addressed c/o Copper Sheets Manufacturing Co., Ltd., Torrington Avenue, Coventry.

THE TREASURY HAVE MADE AN ORDER under Section 10(5) of the Finance Act, 1926, exempting di-glyceryl tetra acetate from Key Industry Duty from June 16, 1937, until December 31, 1937. The Treasury Order is entitled Safeguarding of Industries (Exemption) No. 3 Order, 1937.

THE NATIONAL SMOKE ABATEMENT SOCIETY are transferring their offices from Manchester to London. On and after Thursday, June 24, 1937, the address to which all communications should be sent will be Chandos House, 64 Buckingham Gate, Westminster, S.W.1. Telephone: Victoria 7359. The Society's present London address at 71 Eccleston Square, will no longer be used except where the personal attention of Sir Lawrence Chubb is desired. The addresses of the Scottish and Manchester, Salford and District Branches will remain as at present.

A VERDICT OF "MISADVENTURE" WAS RETURNED at a Widnes inquest, on June 3, on Michael McMullen, aged 30, of Widnes, who received fatal burns at Albright and Wilson's Chemical Works, Widnes, on June 1. A process foreman said he told McMullen to get his filter of a tank containing phosphorus mud ready. Witness shut off the hot water pressure, but owing to his boots and clothing being alight with phosphorus, left him to carry on. Later McMullen came to the office for some clips and returned to the job. Shortly afterwards he heard a hissing noise, and going back, saw McMullen coming towards him in flames. Answering the Coroner, witness said it was a frequent occurrence for the run-off pipe to be blocked, and before anything is done the pressure valve should be released. In this case it was not. McMullen was an experienced worker. Mr. Albright, the works engineer, said they had carried out many experiments to obviate accidents and any protective clothing the men had asked for had been given. In returning his verdict, the Coroner said there had been no breach of the factory regulations.

New Companies Registered

Metallurgical Chemists, Ltd., 75b Queen Victoria Street, E.C.4.—Registered May 22. Nominal capital, £600. Manufacturers of and dealers in chemicals, gases, drugs, oils and medicines, chemical engineers, etc. Subscribers: Albert Mitchell and Marjorie M. Neill.

Parfum Lucien Lelong, Ltd.—Registered May 21. Nominal capital, £1,000. To acquire the stock in trade, trade marks and designs, goodwill and connection in England of Parfum Lucien Lelong Societe Anonyme of Paris, and to carry on the business of importers and manufacturers of and dealers in perfumes, powders, lotions, creams, etc. Subscribers: Vincent G. Honeyball, Bush House, Aldwych, W.C.2; Murdoch McKenzie.

H. Gelpke, Ltd., 1 Leadenhall Street, E.C.3.—Registered May 11. Nominal capital £10,000 in 10,000 shares of £1. To acquire the merchants' business of H. Gelpke and to carry on business as merchants, brokers and agents for the sale of and as manufacturers of coal tar products, chemicals, etc. Subscribers: Herman Gelpke and Arthur R. L. Decks.

Chase and Bell (Hounslow), Ltd., 2 Parklands Parade, Bath Road, Hounslow.—Registered June 3. Nominal capital, £500. Wholesale and retail chemists and druggists, manufacturers of and dealers in chemicals, gases, gypsum, plasters, disinfectants, oils, colours, perfumery, toilet requisites and proprietary articles, etc. Subscribers: Frank L. Sneed, Edward W. Cook.

British Sisalkraft, Ltd., Aldwych House, Aldwych, W.C.2.—Registered as a "private" company on June 4. Nominal capital. £45,100. Manufacturers and exporters of and dealers in reinforced and/or waterproof papers and fabrics, known as "Sisalkraft" and "Fibreen," etc. Directors are: Elmer T. Anderson, Stanley E. Cole, Patrick T. Jackson, Herbert M. Sankey, Melvill Sankey, Allan B. Stevenson.

Findlays (Proprietaries), Ltd., 6 St. Patrick Street, Edinburgh.—Registered in Edinburgh, June 2. Nominal capital, £6,000. To acquire the business of manufacturing and retail chemists, pharmacists, druggists, opticians, photographic and fancy goods dealers and aerated water manufacturers carried on by Findlay and Co., at 6 Patrick Street, Edinburgh. Directors: Mrs. Sarah A. Findlay and J. V. Findlay.

Chemical and Allied Stocks and Shares

DESPITE a disposition to await particulars of the new profits tax, expected next week, the stock and share markets have been rather more active and the tendency was for prices to improve. Sentiment benefited from the statement of the Chancellor of the Exchequer regarding monetary policy. The latter has increased the belief that no early decline in the price of gold is likely, and this is regarded in many quarters as of considerable importance, particularly as it is assumed that a lower price for the metal would lead to reduced prices for commodities.

Imperial Chemical have improved on the week from 36s. 4½d. to 37s. and Salt Union from 53s. 1½d. to 54s. United Molasses were little changed at 30s. 10½d., and Imperial Smelting were steadier, aided by the hope that resumption of dividends with a small payment may be possible for the financial year ending this month. Metal Traders were active around 72s. on the full results, and Amalgamated Metal shares were also reported to be in increased demand. British Oxygen came in for larger request when "ex" the bonus. B. Laporte transferred around £5 and now have a list price of 4⅝-5⅜. Distillers were good having recovered from 112s. 6d. to 115s. 6d. on the possibility that the results, due next month, may show a less conservative policy and possibly a larger dividend or a bonus.

Unilever were active around 42s., but Turner and Newall, which were influenced by non-confirmation of market hopes of a larger interim dividend, are 93s. 1½d., compared with 95s. a week ago. Fison, Packard and Prentice, although now "ex" the interim dividend, have improved on the week from 38s. 9d. to 39s. 6d., and were reported to be more active than for some time. Cooper, McDougall and Robertson remained around the higher price of 36s. 6d. British Oil and Cake Mills continued to come in for more attention on account of the generous yield offered and have improved further to 48s. 6d., a gain of 6d. British Glues remained under the hope of a larger dividend and made the rather higher price of 8s. 9d. Lever Brothers' preference shares remained firm. General Refractories lost 3d. to 29s. 3d. British Drug Houses were again 22s., and there was improvement in British Industrial Plastics from 2s. 9d. to 3s. Boots Pure Drug put on a few pence to 51s. 3d., and Timothy Whites and Taylors, and Sangers, were again steady, the last-named being assisted by market hopes that the dividend will be unchanged.

Associated Portland Cement, British Plaster Board, Pinchin Johnson and other shares connected with the building trades received more attention in view of the favourable yields offered. Despite the larger capital arising from the bonus, the general belief in the market is that Pinchin Johnson may very well be able to increase its dividend above 20 per cent. Wall Paper deferred were in demand and have risen from 40s. 7½d. to 42s. at the time of writing.

Triplex Safety Glass continued to receive more attention and have been active around 68s. The market is talking of a dividend of 30 per cent. or 35 per cent. Forster's Glass 10s. ordinary shares have been held firmly around 23s. 9d. in view of the bonus announced recently. For some years the company has followed a conservative dividend policy. Canning Town Glass shares were more active, as were Lancegaye Safety Glass and British Indestructo Glass.

Dorman Long, Richard Thomas and other leading iron and steel shares were better in price on the assumption that companies whose profits seem likely to rise further will probably not be affected to nearly the same extent by the new profits tax as they would by the N.D.C., which was designed to tax increased profits. Consett Iron have been steady since declaration of the 7½ per cent. dividend, which it is generally anticipated will be shown by the full results to be a conservative payment.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

PROCESS FOR THE MANUFACTURE OF ELASTIC ARTIFICIAL MASSES prepared by the interaction of polysulphides and dihalogenated hydrocarbons.—Silesia Verein Chemischer Fabriken. Nov. 29, 1935. 1225/36.

PRODUCTION OF POLYCARBOXYLIC ACIDS and anhydrides.—American Cyanamid Co. Nov. 25, 1935. 21591/36.

PROCESS FOR THE INDUSTRIAL PRODUCTION OF ALUMINA POWDER. Siemens and Halske, A-G. Nov. 30, 1935. 32195/36.

PROCESS AND APPARATUS FOR PROCESSING TEXTILES.—G. W. Steiger. Nov. 27, 1935. 32306/36.

MANUFACTURE OF OXYBENZOFLUORENONES.—Soc. of Chemical Industry in Basle. Nov. 26, 1935. 32407.

MANUFACTURE AND PRODUCTION OF VALUABLE HYDROCARBONS and their derivatives containing oxygen.—I. G. Farbenindustrie. Nov. 30, 1935.

MANUFACTURE OF CONDENSATION PRODUCTS of the diphenylamine series.—I. G. Farbenindustrie. Nov. 28, 1935. 32573.

PROCESS FOR THE CONVERSION OF HYDROCARBON OILS.—Universal Oil Products Co. June 24, 1935. 14756/37.

REFINING OF HYDROCARBON OILS.—Edeleanu Ges. May 23, 1935. 15081/37.

Specifications Accepted with Date of Application

MANUFACTURE AND PRODUCTION OF NITROGENOUS PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 22, 1935. 466,270.

MANUFACTURE AND PRODUCTION OF OLEFINES.—G. W. Johnson (I. G. Farbenindustrie.) Oct. 24, 1935. 466,210.

MANUFACTURE OF ETHYLENE OXIDE.—Distillers Co., Ltd., H. Langwell, and H. M. Stanley. Nov. 22, 1935. 466,417.

CONDENSATION PRODUCTS and cellulose derivative compositions containing them.—British Celanese, Ltd. Nov. 23, 1934. 466,421.

THERMO-PLASTIC COMPOSITIONS containing an organic derivative of cellulose, and articles coated or impregnated therewith.—British Celanese, Ltd. Nov. 23, 1934. 466,490.

PROCESS FOR THE MANUFACTURE OF CONDENSATION PRODUCTS from substitution products of 2.3-hydroxy-naphthoic acid.—I. G. Farbenindustrie. Nov. 26, 1935. 466,358.

MANUFACTURE AND PRODUCTION OF ACETALDEHYDE from gases containing acetylene.—I. G. Farbenindustrie. Nov. 28, 1935. 466,569.

SYNTHESIS OF ESTERS of methacrylic acid.—Triplex Safety Glass Co., Ltd., A. C. Waine and J. Wilson. Nov. 28, 1935. 466,504.

PROCESS FOR DYEING LEATHER.—A. Carpmael (I. G. Farbenindustrie.) Nov. 28, 1935. 466,215.

PROCESS FOR THE MANUFACTURE OF ACRIDINE DERIVATIVES.—A. Carpmael (I. G. Farbenindustrie.) Nov. 28, 1935. 466,505.

MANUFACTURE OF BARIUM SULPHATE.—B. Laporte, Ltd., I. E. Weber and W. S. Wood. Dec. 28, 1935. 466,216.

MANUFACTURE OF FLUORINE COMPOUNDS OF ALIPHATIC HYDROCARBONS.—I. G. Farbenindustrie. Nov. 29, 1934. 466,509.

Applications for Patents

MANUFACTURE BY THERMO-ACTION of special steels, etc.—Fonderies Françaises d'Aciers Speciaux Inoxydables. (France, March 12.) 14403.

PREPARATION OF TRANSPARENT RESINOUS PRODUCTS.—J. P. Fraser and H. Barnett. 14233.

PRODUCTION OF COATED FABRICS.—B. Frenkel. 14256.

MANUFACTURE OF LIGHT-SENSITIVE EMULSIONS.—W. W. Groves (I. G. Farbenindustrie). 14063.

MANUFACTURE OF AZO DYESTUFFS ON THE FIBRE.—W. W. Groves (I. G. Farbenindustrie). 14164.

MANUFACTURE OF PRODUCTS CONTAINING NITROGEN AND SULPHUR. W. W. Groves (I. G. Farbenindustrie). 14298, 14299, 14300.

SURFACE TREATMENT OF METALS.—F. W. Haywood. 14242.

SULPHUR DERIVATIVES OF UNSATURATED ORGANIC MATERIALS, ETC. Hercules Powder Co. (United States, July 27, '36.) 14371.

SMELTING IRON ORE containing substantial amounts of zinc.—Hüttenwerke Siegerland. (Germany, Aug. 4, '36.) 14155.

APPARATUS FOR RECOVERY OF AROMATIC HYDROCARBONS.—I. G. Farbenindustrie. 14074.

PROCESS FOR PURIFYING CAUSTIC-SODA LYES.—I. G. Farbenindustrie. (Germany, July 23 '36.) 14087.

PROCESS FOR OBTAINING VALUABLE POLYMERS from hydrocarbon gases.—I. G. Farbenindustrie. (United States, June 27, '36.) 14163.

PROCESS FOR DYEING SKINS, ETC.—I. G. Farbenindustrie. (Dec. 16, '36.) (Germany, Jan. 24, '36.) 14168.

MANUFACTURE, ETC., OF AZO COMPOUNDS OF HIGH MOLECULAR WEIGHT.—I. G. Farbenindustrie (Germany, May 22, '36.) 14202.

CONVERSION OF CARBON MONOXIDE by means of hydrogen.—I. G. Farbenindustrie. 14267.

CELLULOSE MATERIAL AND PROCESS THEREFOR.—I. G. Farbenindustrie. (Germany, May 23, '36.) 14380.

TEXTILE MATERIAL OF ANIMAL ORIGIN AND PROCESS THEREFOR.—I. G. Farbenindustrie. (Germany, May 23, '36.) 14381.

HEAT TREATMENT OF METALS.—Imperial Chemical Industries, Ltd., M. D. Water, and G. A. V. Russell. 14110.

SURFACE TREATMENT OF METALS.—Imperial Chemical Industries, Ltd. 14242.

MONOAZO DYESTUFFS.—Imperial Chemical Industries, Ltd. 14662.

MANUFACTURE AND PRODUCTION OF GLUE.—G. W. Johnson. I. G. Farbenindustrie, 14075.

MANUFACTURE AND PRODUCTION OF VINYL CHLORIDE.—G. W. Johnson. 14076.

MANUFACTURE AND PRODUCTION OF VAT DYESTUFFS OF THE ANTHRAQUINONE SERIES.—G. W. Johnson. (Dec. 6, 1935.) 14077.

MANUFACTURE, ETC., OF INTERPOLYMERIZATION PRODUCTS.—G. W. Johnson. 14201.

MANUFACTURE, ETC., OF UNIFORMLY GRAINED MIXED FERTILISERS.—G. W. Johnson. 14269.

POLYMERISATION OF GASEOUS OLEFINES.—G. W. Johnson. 14401.

MONOAZO DYESTUFFS.—A. H. Knight, and W. H. Cliffe. 14662.

MANUFACTURE OF GRANULAR CONCRETE HARDENING MATERIALS.—K. Klopstock and A. R. Neelands. 14373.

METHOD OF TEMPERING SHEETS OF GLASS.—A. C. Knipe. 14480.

PREPARATION OF β-(*p*-OXYPHENYL)-ISOPROPYLMETHYLAMINE.—Knoll Chemische Fabriken. (Germany, May 26, '36.) 14592, 14593.

MANUFACTURE OF HOLLOW METAL RODS, ETC.—F. Lloyd. 14081.

METALLURGICAL FURNACES, ETC.—M. van Marle, Wild Barfield Electric Furnaces, Ltd., and E. P. Barfield. 14321.

TREATMENT OF CHLORINATED RUBBER and products thereof.—H. Michaelis. (Germany, May 23, '36.) 14304.

PRODUCTION OF PARAFFIN HYDROCARBONS.—A. L. Mond (Universal Oil Products Co.). 14551.

PROCESS FOR THE ALKYLATION OF PARAFFIN HYDROCARBONS.—A. L. Mond. 14552, 14604.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

HOUGHTON AND HALL, LTD., Newcastle-on-Tyne, manufacturers of glass, etc. (M., 12/6/37.) May 31, £3,000 debenture, to Special Areas Reconstruction Association, Ltd.; general charge.

GEORGE E. TUPHOLME AND CO., LTD., Sheffield, manufacturers of sheet metals, etc. (M., 12/6/37.) May 29, debenture to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; general charge.

SULFUROPHOSPHATE MANUFACTURING CO., LTD., Kidderminster. (M., 12/6/37.) May 27, £200 "A" debentures and £500 "B" debentures, parts of amounts already registered.

Satisfactions

REMBIA RUBBER CO., LTD., London, E.C. (M.S., 12/6/37.) Satisfaction June 1, of debenture stock registered February 28, 1934, to extent of £1,350.

HENDERSON'S WELSH ANTHRACITE COLLIERIES, LTD. (formerly Pwllbach Tirbach and Brynamman Anthracite Collieries, Ltd.), London, E.C. (M.S., 12/6/37.) Satisfactions May 28, of debenture stock registered April 29, 1924, February 11, 1926, and October 16, 1928, to extent of £913,742 and balance of £286,258 cancelled.

Applications for Discharge

STAFFORD, GEORGE BASIL, company director and manufacturing chemist, lately trading as Basil Stafford Laboratories, and as Stafford Services, and described in the Receiving Order as Basil Stafford, 47 Knightsbridge, S.W., and lately carrying on business at 11 Diana Place, N.W.1, both in the county of London. (A.F.D. 12/6/37.) Hearing, June 29, 1937. 11 a.m. Bankruptcy Buildings, Carey Street, London, W.C.2.

Companies Winding-up Voluntarily

CHILEAN NITRATE COMPANY, LTD. (C.W.U.V., 12/6/37.) By special resolution, June 3, 1937. Mr. Norman Airth Grant, of Sackville House, 143-9 Fenchurch Street, London, E.C.3, appointed liquidator.

BARIUM CONSOLIDATED, LTD., (C.W.U.V., 12/6/37.) By reason of its liabilities. By special resolution, May 31, 1937. G. C. Mumford, F.C.A., of Bassishaw House, Basinghall Street, London, E.C.2, appointed liquidator.

Receiverships

CHARLES AND COMPANY, LTD., soap boilers, etc., Marshalls Mills, Marshall Street, Leeds, 11. (R., 5/6/37.) Fredk. C. Mair of 2 Park Place, Leeds, was appointed Receiver on May 24, 1937, under powers contained in debenture dated March 23, 1926.

Books Received

Silicate Analysis. By Dr. A. W. Groves. London: Thomas Murby & Co. Pp. 230. 12s. 6d.

Directory of Paper Makers of Great Britain and Ireland, 1937. London: Marchant Singer & Co. Pp. 306. 5s. 6d.

Forthcoming Events

LONDON.

June 16.—Electrodepositors' Technical Society. "Question" night, "Minimum requirements for Testing Plating Solutions." J. W. Perring. Discussion on Control of Solutions, opened by Mr. J. W. Perring. 8.15 p.m. Northampton Polytechnic Institute, St. John Street, Clerkenwell, E.C.1.

MANCHESTER.

June 19.—Oil and Colour Chemists' Association. Summer Outing.

Company News

"Sanitas" Trust.—A final dividend of 1d. per share, or 8⅓ per cent., tax free (same) has been announced.

"Shell" Transport and Trading Co.—A final dividend of 12½ per cent., making 20 per cent., tax free, for 1936, which compares with 17½ per cent., tax free, for 1935 is announced.

Royal Dutch Co.—The directors announce a final dividend of 11½ per cent., making 16½ per cent. for 1936. This is an increase of 6 per cent. on the amount paid in the previous year.

Lautaro Nitrate.—Interim payments on account of interest of 1½ per cent. will be made on June 30 on the first mortgage income debenture stock and the first mortgage Antofagasta debenture stock.

Yorkshire Dyeware and Chemical.—A final dividend of 5 per cent., making 10 per cent., plus cash bonus of 2s. per share, less tax (against dividend 10 per cent. and bonus 1s. per share) is announced.—It is also proposed to capitalise £50,000 of reserve and to distribute as bonus to shareholders one new share for every four shares held.

Boots Pure Drug Co.—The directors have declared a dividend of 6 per cent., less tax, on the ordinary shares for the quarter ending June 30, to be paid on that date to shareholders on record on June 10. Quarterly dividends aggregating 24 per cent., less tax, have been paid for many years past, and since 1929 have been followed by bonuses of 5 per cent., tax free. The authorised and issued capital of the company is £3,000,000.

Bradford Dyers' Association.—The directors have decided to pay the interest on the 4 per cent. debenture stock, as usual, on July 1 next, and to postpone payment of the dividend on the 5 per cent. cumulative preference stock for the six months ending June 30. Dividends on the £2,549,237 preference stock is in arrears since the end of 1932, and the last distribution on the £2,258,794 ordinary stock was 4½ per cent., less tax, for 1930. Of the £6,000,000 authorised capital of the company, £4,808,031 is in issue.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Poland.—A firm of agents long-established at Lodz desires to obtain the representation of United Kingdom manufacturers of chemicals and dyestuffs for the textile industry. (Ref. No. 225.)

Poland.—An agent established at Warsaw wishes to obtain the representation of United Kingdom firms in a position to supply plastics, waxes, shellac, resins, etc. (Ref. No. 226.)

Iraq.—A firm in Mosul wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of iron, copper bottoms, and cement. (Ref. No. 230.)

Australia.—A firm of manufacturers' agents and wholesale merchants established at Sydney wish to secure United Kingdom agencies, on a basis to be arranged, for the whole of the Commonwealth with the exception of Western Australia, of fine chemicals. (Ref. No. 218.)